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RE CHIMNEY SWEEPS "CLEANING UP"? -SEE PAGE 108-

THE MOTHER EARTH NEWS®

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BONUS:
A SPECIAL WINTER CRAFTS MINI-MANUAL!
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The advantages of a John Deere tiller from the ground up.

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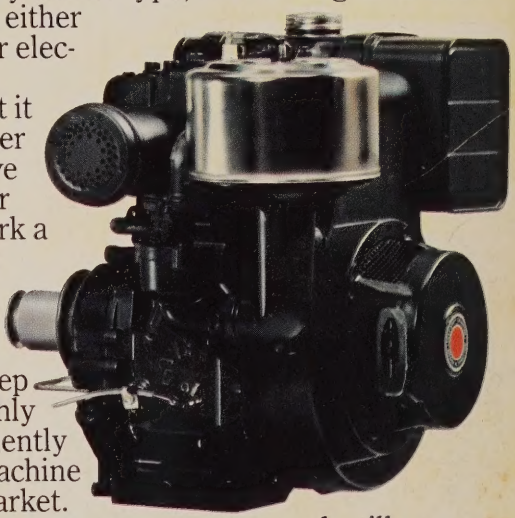

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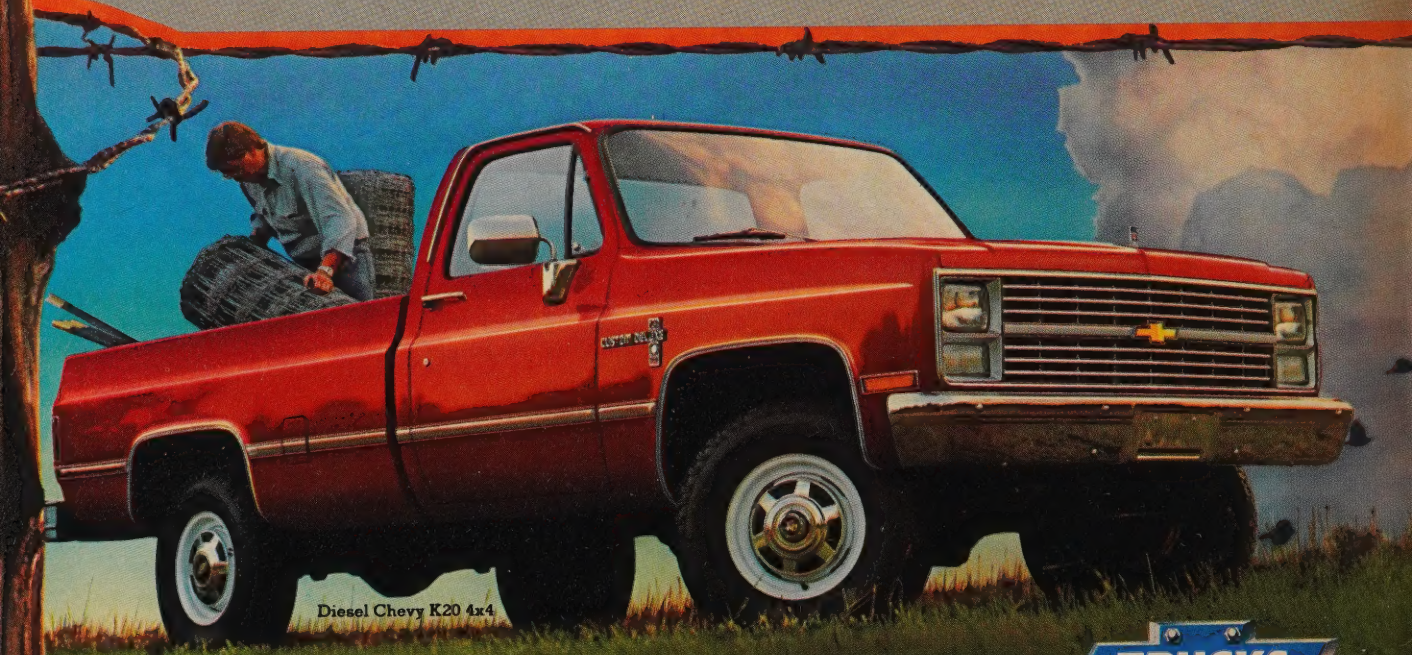

Diesel Chevy K20 4x4

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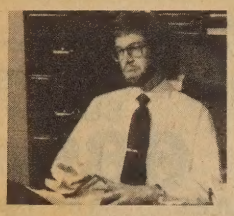
16 

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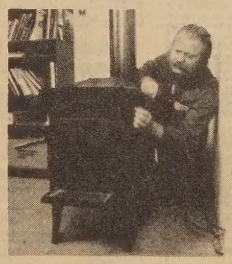
128 

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NEWS FROM MOTHER

AW, YOU NOTICED!

Regular readers of MOTHER may well be surprised by some of the changes in this issue. Well, let's just say that MOM's New Year's resolution was to make an extra-special effort in 1984 to bring you the best, most useful magazine we can. So we've introduced just a couple of new things to our already-feature-filled editorial package, beginning with . . .

THE RETURN OF THE MINI-MANUAL

You have to be a real MOTHER old-timer to recall when we last devoted an entire *section* of this magazine to one topic. (All ye who promptly replied, "Issue 47!" can consider yourselves official members of the "Faithful Reader Fellowship".) The advantage of focusing several pages on one subject area is obvious: It gives us the opportunity to cover a topic with a good deal more detail and breadth of scope than we otherwise could. Of course, the *disadvantage* is clear, too . . . more work for those of us who create this contents-crammed magazine. But we're going to put forth the extra effort and, for the near future, try to offer you as many of these special sections as possible. (Be sure to let us know how you like them: We wouldn't want to knock ourselves out for nothing!)

We decided to inaugurate the return of the mini-manual with this issue's lovely collection, "A Gallery of Winter Craft Projects", on pages 37–50. We chose this knitting and crocheting theme for several reasons: [1] January and February are great months for indoor, sit-by-the-fire undertakings, [2] we collected a really fine group of creative patterns and garments—ranging from "even a beginner can do it" efforts to projects "fit for a pro"—and [3] we feel (as many of you do) that *handmade* tends to mean *well made.*

So, with hooks and needles, try your hand at our delightful selection of winter warmers. (Or, if you're the type who absolutely can't sit still indoors for more than ten minutes, wait until next issue . . . for an outdoor recreation mini-manual!)

THE HOMESTEAD HANDBOOK

From time to time, new readers of MOTHER write in to say they wish we'd devote a bit more space to simple down-to-earth homesteading skills. Well, we've always tried to cover a wide spectrum of such topics, from beginner's basics to sophisticated improvements, but—perhaps because we don't want to risk repeating information presented in our 84 back issues—we may at times have *assumed* knowledge of the fundamental back-to-the-land skills.

To insure that this possible—and unintentional—neglect is addressed, we hereby declare that we'll try (remember, these are *resolutions*, not *guarantees*) as often as possible to present an ongoing, how-to-do-it primer . . . called "The Homestead Handbook". This issue's entry—written by John Vivian, a well-known homesteading expert—begins on page 82 and will tell you *all* you need to know to build your own mortarless farmstead stone wall.

Of course, you'll have to provide *your own* muscle power (we can't do everything!).

GAIN A LITTLE, LOSE . . .

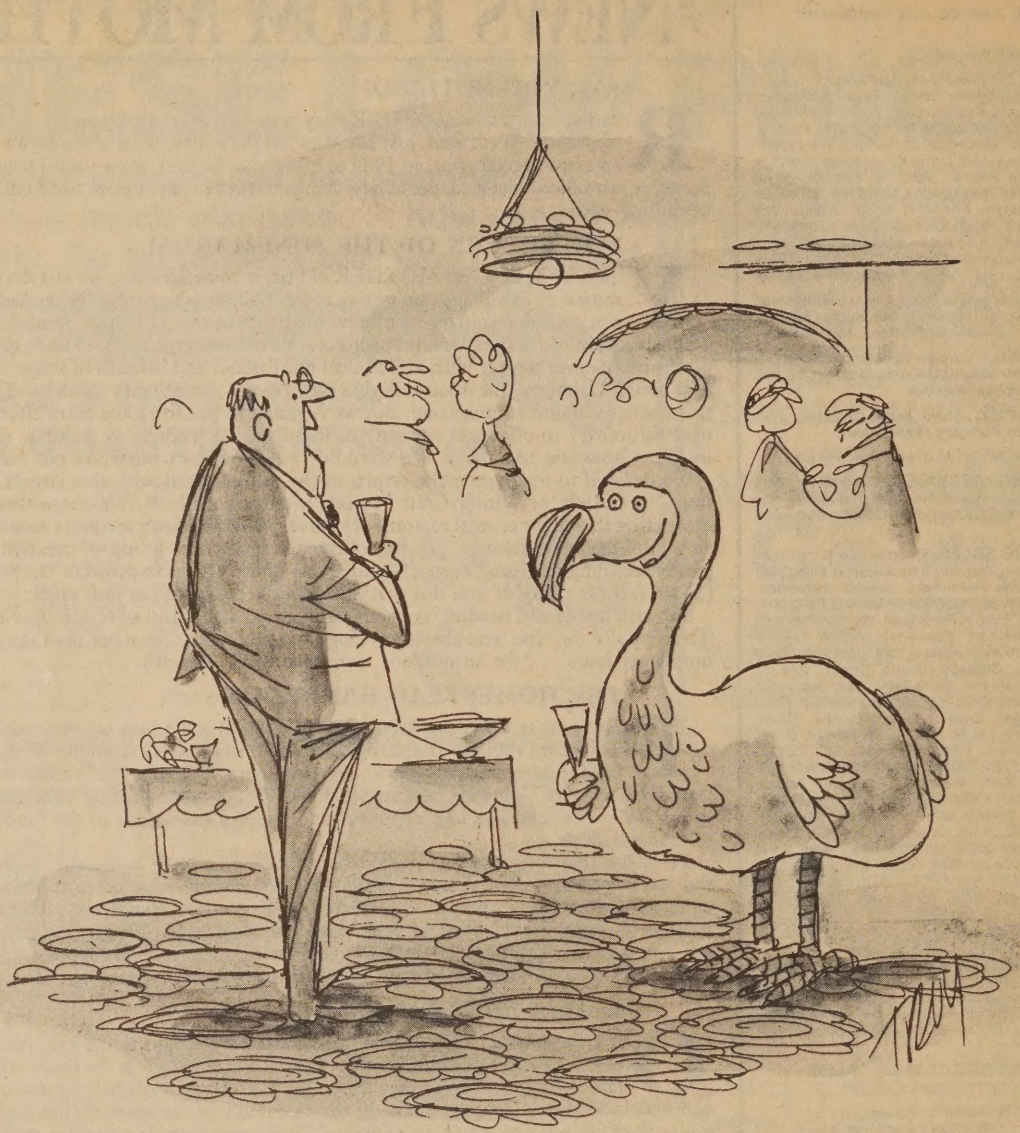
Once we resolved to add these two good-sized sections to the magazine, we realized that we'd have to *subtract* some things to make it all fit. So there are a few regrettable changes to announce this time, too. Along with boiling down our contents and masthead pages (actually, though, the new table of contents should be *easier* for you to use than the old one was!), we've had to drop some long-time regular columns: namely, Getting There, Homegrown Music, Local Self-Reliance, Mr. Digwell, and New Directions Radio. (We've also squeezed Successful Swaps and Bootstrap Businesses into one feature, Barters & Bootstraps.) Believe us, this wasn't easy . . . the creators of many of those columns are dear friends of ours, and we've always valued their contributions to this magazine. But *something* had to go.

OH, BY THE WAY

Now we don't want the fact that we've talked so much about the relatively few changes we've made to MOTHER to obscure the fact that there's a heck of a lot of *other* excellent material in this issue! No sir, there's a world of good, useful reading here in issue 85, including a Plowboy Interview that anyone concerned with health just *has* to read . . . our brand-new design for a nifty solar hot-air collector that's built out of recycled storm windows . . . a you-won't-find-it-anywhere-else size-up of various stringed folk instruments . . . MOM's own great-working compost toilet . . . a report of what happened when we sent a staffer to the national convention of North American *dowsers* . . . and (we've said this before, but it's always true) much, much more.

AND FOR YOUR GREEN THUMB

MOM's crew traveled from coast to coast to research the dozens and dozens of articles that comprise our newest special publication, *An Array of Gardens: Vegetables and Flowers for Everyone in Every Climate.* Made up of more than 90% new material, this flower and vegetable lover's guide will show you everything from how to create privacy in a small front yard with a unique "mound garden" to how to harvest food and flowers from a *no-cost* "weed garden". In addition, it will put you in touch with the top public gardens (and garden clubs) in your area and take you back in time to inspire you with old-fashioned fragrance, herb, clock, astrological, formal, and colonial growing plots. Look for *An Array of Gardens* on your newsstand this February (or order it by mail—for $3.95 plus $1.25 shipping and handling—from Mother's Bookshelf®, 105 Stoney Mountain Road, Hendersonville, North Carolina 28791). ●



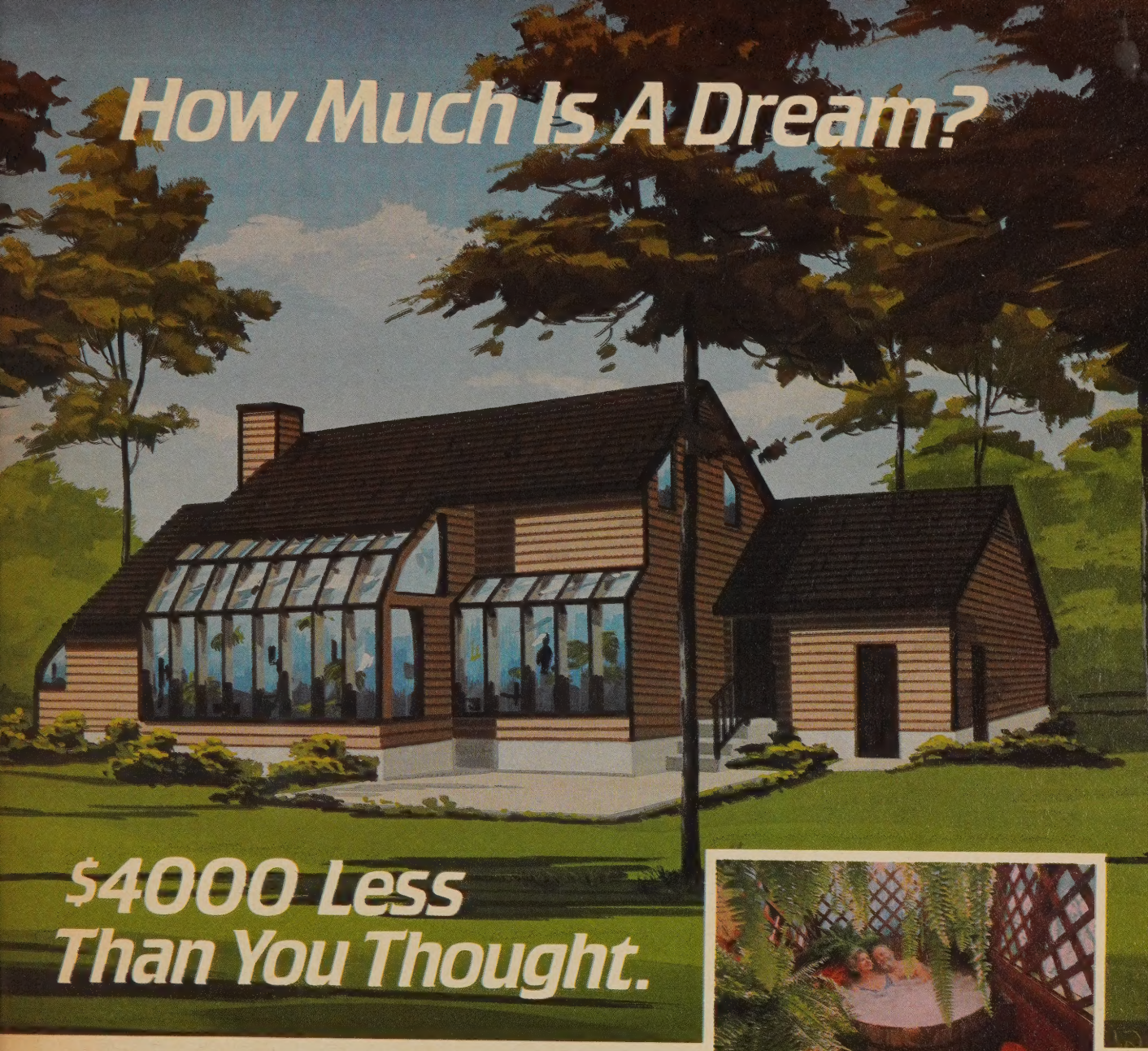
"And what, may I ask, motivated you to become an environmentalist?"

LET THE MEN & WOMEN OF WISDOM SPEAK

"One of the penalties of an ecological education is that one lives alone in a world of wounds. Much of the damage inflicted on land is quite invisible to laymen. An ecologist must either harden his shell and make believe that the consequences of science are none of his business, or he must be the doctor who sees the marks of death in a community that believes itself well and does not want to be told otherwise."

Aldo Leopold

How Much Is A Dream?



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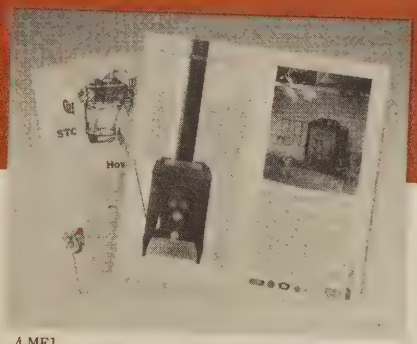
WE BUILD OUR STOVES WITHOUT COMPROMISE.

Consolidated Dutchwest

ELEGANT FEDERAL CONVECTION WOOD & COAL BURNING STOVES AND INSERTS ARE REDUCING THE COST OF HEATING HOMES ACROSS AMERICA BY 50% - 90%

STOVES BUILT WITHOUT COMPROMISE.

Please send me your free information package, including a 36-page color catalogue of cast iron wood and coal stoves and fireplace inserts, "The Stovebuyer's Guide" of things to look for when purchasing a stove, and details of our off-season pricing and complementary accessories (good through May 23, 1984).



I plan on purchasing a stove:
☐ **for use during the current heating season**
☐ **for use beginning next fall** ☐ **do not know**

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State _____ Zip _____

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Consolidated Dutchwest

8A

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BUILT WITHOUT COMPROMISE, SO YOU WON'T HAVE TO.

When considering a stove or fireplace insert it's difficult to know what's important and even harder to be certain what to expect from wood or coal heating. At Consolidated Dutchwest our approach to your concerns and questions is very straightforward. We build our stoves without compromise so that you won't have to. We build in every important feature so they'll be there when you need them. We start with safety. Each unit exceeds all safety requirements. To very safe operation we add efficiency in an airtight design with precision controlled combustion. Using such stoves our customers consistently report fuel savings of 50%, 70%, even 90% when they converted from conventional heating to our stoves. You can expect exceptional savings too.

WOOD & COAL BURNING CAPABILITIES

To safety and efficiency we add wood *and* coal burning capability because fuel flexibility is as invaluable as are the coal related features—even if you never burn coal. An ashpan, ashbin, and shaker grate are essential for coal. With wood they're just plain useful—for easier fire starting and ash removal. Most stoves burn wood *or* coal and involve additional parts and time consuming steps to convert from one fuel to the other. Our conversion takes 30 seconds. Our best selling models provide both radiant *and* convection heating. Heat is egalitarian. It radiates in all directions including the less productive ones—bottom and back. Our convection systems channel warmed air from bottom, back, and top through unobtrusive vents on the stove front.

Stoves are sized according to need. Small stoves for smaller spaces and large stoves for houses. Most units can be vented from top and back. Others convert from free standing to become fireplace inserts. Flexibility is paramount.

FEDERAL PERIOD STYLING

While concentrating on function we haven't compromised on appearance. We've employed the simple clear lines of Federal period (1810-1830) architecture in a series of arches and raised lines to give a unique sense of beauty to what is after all primarily a functioning heater. Our distinctive pebble finish and solid brass trim highlight this appearance. We know our stoves will frequently be sited in living rooms and we've gone to great lengths to assure they belong there. Those of you who eventually own a Consolidated Dutchwest stove will find our trademark pebble finish is not only beautiful but also increases our stoves' radiant surfaces by one third. Even while stressing appearance we don't forget function.

HAND-CAST, AIRTIGHT CONSTRUCTION

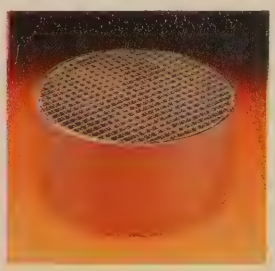
We believe in providing the best possible value. Our stoves are hand cast and hand assembled entirely of virgin grey iron. They're airtight to the point where even our smallest stove can hold a wood fire through the night. Our larger units, lit at daybreak, will still be heating your home well after sunset on a single load of wood. With coal the burn times are even longer. All models, inserts included, have cooktop space. Most load from front and side (as does the Large Federal Convection Heater illustrated on the facing page). Ceramic glass windows are standard as is a screen for open hearth burning. Self-tightening door locks (to maintain an airtight fit on all doors at all times) are a simple but important feature, as is the ability to use a single solid brass handle (we give you three) to open all doors, dial the primary and secondary air dampers, and set the screen in place.

A COMPLETE UNIT

We don't believe in options. They too often mask essential features that have to be purchased to make a stove useable. Our list of options makes quick reading. An $80.00 catalytic combustor which is warranted for 4 years, burns creosote and wood gas on the way to providing a 17% increase in combustion efficiency and a 90% reduction in creosote. A 100 cfm fan, standard on our inserts and optional on free standing models enhances convection air flow 5 fold. An oval to round adapter with damper facilitates mounting pipe in tight quarters. A mitten rack and decorative brass rail complete the stove options. All else is standard including delivery to your door, a 30 day money back guarantee and a 3 year warranty.

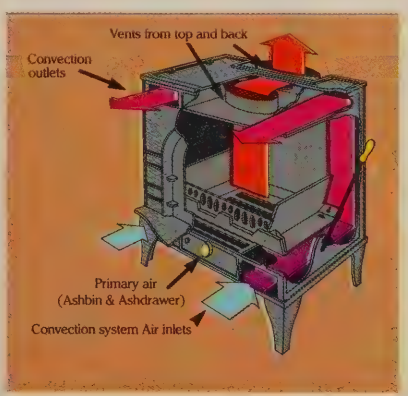
SAVE THIS SPRING

During the spring we offer a last chance at last year's prices and a choice of free accessories (kettles and firesets) which make for a potential spring savings of up to $154.00.



***Left:** The Federal Convection can be converted from use with wood to coal in less than a minute.*
***Center:** An ashbin and tray provide for easy removal of ash.*
***Right/below:** Palladium-coated combustor in the Catalytic Federal Convection increases combustion efficiency while providing for cleaner, smoke-free burning of wood.*

WRITE, OR CALL TOLL-FREE: 1-800-225-8277
(IN MASS. 617-747-1963)



SEND FOR YOUR FREE INFORMATION PACKAGE

Please send me your free information package, including 36-page color catalogue of fuel efficient stoves and fireplace inserts; "the Stovebuyer's Guide," a clearly written guide of things to look for when purchasing a stove, and our off-season pricing and free gift offer.

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Or, you may call (toll free) for your free catalogue, 1-800-225-8277 or 1-800-722-5556 (in Mass. 617-747-1963).

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Now America's top-selling full-size 4x4 offer tops in gas and diesel engines, too. Ford's 4.9L I-6 is the biggest, with the most torque, in any pickup. The 7.5L is the biggest V-8. And Ford's 6.9L diesel has 26 more horsepower than Chevy. Plus roomy regular cab, Crew Cab or big Ford SuperCab.

*Based on registrations through May, 1983.

Get it together–Buckle up!

Quality is Job 1.

Ford's commitment to quality results in the best-built American trucks, based on a survey of owner reported problems during the first three months of ownership of 1983 trucks. And the commitment continues in 1984.

BUILT FORD TOUGH

Ford

MOTHER'S LIFERS

Away back in MOTHER NO. 9, we printed a letter from Robin Graham of Hungry Horse, Montana . . . asking, "Do you sell life subscriptions to MOTHER?"

"We do now," we answered . . . and—surprise upon surprise—folks soon began signing up as lifetime subscribers.

And that would have been that for most magazines. We decided, however, to try to make a lifetime subscription to THE MOTHER EARTH NEWS® do something more than [1] guarantee delivery of the publication to the individual buying such a subscription and [2] support the magazine. We decided to [3] earmark all such moneys received for the eventual financing of what we've come to call MOTHER's Ecological Research Center.

So, if you've been thinking about signing up for the duration with MOTHER, you should remember that your investment ($600 in the U.S., $700 Canada and foreign) does three things: [1] It makes it just that much easier for us to keep on publishing still bigger and better MOTHERS, [2] it assures you of receiving every one of those issues that you're entitled to for as long as there *is* a MOTHER (forever, we hope!), and [3] it helps us finance the research center.

That really is stretching today's shrinking dollar, and, in return for your nonrefundable contribution, you will receive [1] every issue of MOTHER that is printed for as long as you live, [2] recognition—unless you request otherwise—in this magazine, [3] a genuine Certificate of Thanks, [4] your name—unless you request otherwise—listed permanently at the research center as one of *The People Who Made This Research Center Possible*, and [5] the satisfaction of having been part of, we hope, Something That Counts.

And a Great Big THANKS to the 5,954 MOTHER's Lifers whom we have already featured . . . and to these 69 "newcomers".

5955. Nelson Morgan, Albuquerque, New Mexico
5956. Carolyn J. Nobiling, Moline, Illinois
5957. Jeffrey Robertson, Milton, Florida
5958. Loretta Schlachta, San Antonio, Texas
5959. Robert L. Speight, Garland, Texas
5960. Patrick R. Stark, Manassas, Virginia
5961. Randall Tylinski, Mountain Home, Arkansas
5962. Gary J. Tolotti, Las Vegas, Nevada
5963. Eric G. Vilain, APO New York, New York
5964. Wayne Wardlow, Cut Off, Louisiana
5965. Ronald L. Badger, Rough And Ready, California
5966. Susan Barten, Nelson, Minnesota
5967. Tom Bauman, Brooklyn, Iowa
5968. Luke Beek, Prince George, British Columbia
5969. Hugh D. Bollinger, Dayton, Ohio
5970. Deborah Brown, College Station, Texas
5971. Patricia Button, Camillus, New York
5972. Charles C. Conway, Kansas City, Missouri
5973. Walter D. Cosdon, Death Valley, California
5974. Fern M. Davis, Haines, Oregon
5975. Michael A. Fitzgerald, Oakdale, Minnesota
5976. Barbara J. Grimes, Akron, Ohio
5977. Vickie L. Hastings, Lacon, Illinois
5978. Mrs. Donald F. Pitts, Gardner, Kansas
5979. Bruce Allan Knoff, Devils Lake, North Dakota
5980. Tobias Letourneau, Jr., St. Paul, Minnesota
5981. Boötes Cameron, Cleveland, Ohio
5982. Cathy R. Oates, Indianapolis, Indiana
5983. Ann L. Edenfield, Albuquerque, New Mexico
5984. Eugene Grover Rivers III, Miami, Florida
5985. Johnnie D. Greenstreet, Goltry, Oklahoma
5986. Ricky B. Self, Covington, Georgia
5987. James F. Henline, Jr., Tunnelton, West Virginia
5988. Bruce Stephen Chamberlain, San Jose, California
5989. Douglas Miller, El Cajon, California
5990. Joseph Giebel, Jr., Sicklerville, New Jersey
5991. Mary A. Purdy, Rock Springs, Wyoming
5992. Carole Ann Turner, Hialeah, Florida
5993. Robert M. Miltner, Solon, Iowa
5994. Roger E. McNutt, Portales, New Mexico
5995. Eric J. Tereszkiewicz, Norfolk, Virginia
5996. David A. Rice, Davis, California
5997. Evelyn Potter-Meyer, Goulds, Florida
5998. Michael Anthony Savone, St. Louis, Missouri
5999. Fred R.E. Dodge, Daly City, California
6000. Richard M. Baruth, Davison, Michigan
6001. Patrick T. Putnam, APO New York, New York
6002. Harry Nethers, Dayton, Ohio
6003. Dennis Swaney, Rancho Cordova, California
6004. John Wernersbach, East Quogue, New York
6005. Thomas Brace, Ashtabula, Ohio
6006. Alan Stirling, Union City, California
6007. Judith D. Petersen, Littleton, Colorado
6008. Mildred Peek, Big Bar, California
6009. Steven A. Feild, Columbus, Ohio
6010. M.J. Edmondson, Big Sur, California
6011. Glenn Saline, Aztec, New Mexico
6012. Richard Shetron, Troy, New York
6013. Randall C. Smith, Boring, Oregon
6014. Gary R. Updyke, Sunfield, Michigan
6015. James Whitson, Jr., Berry, Alabama
6016. Wesley W. Will, APO New York, New York
6017. Richard York, Preston Hollow, New York
6018. Mrs. John E. Pike, Union City, Ohio
6019. Steven Lynn Sellers, Columbus Grove, Ohio
6020. Robert A. Johnson, Oxnard, California
6021. Gaetano John Tata, Davie, Florida
6022. Larry Lee Willets, Creston, Iowa
6023. Frank Ozak, Sylmar, California

KEEP NEW HEAT IN WITH OLD CUPS

Bertram H. Dawkins

In these days, when squeezing every bit of warmth from your home heating fuel is important, you can't afford to overlook the energy loss that may occur when hot water passes from your boiler to your radiators.

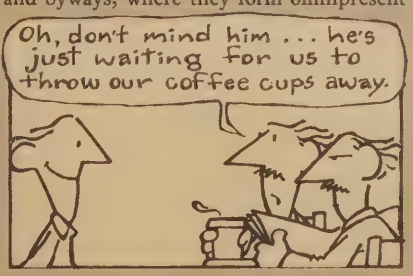
For example, in my home, as in so many others, hot water travels through a number of exposed pipes—in an *unheated* basement—before it actually starts to warm the living room, a process that wastes energy (and money). The answer, of course, is to insulate that water-carrying network . . . but the cost of manufactured pipe insulation is surprisingly high (I've seen it run as much as 30 to 50¢ a foot). Happily, though, I've found a way to make high-efficiency insulation myself, and—since the raw materials consist of discarded plastic foam drinking cups—the price is *right*!

IT'D BETTER BE GOOD

As any heat-transfer expert will tell you, wrapping water conduits with just any old material can actually result in heat *loss* instead of conservation. That's because placing anything around a pipe increases the surface area that's exposed to cold air. Therefore, whatever wrap you use must have a high insulating value in order to offset that factor. Fortunately, polystyrene foam is one of the very best insulators around, and used coffee containers have two other features that contribute to their efficiency. First, only the edge of each cup's bottom is in contact with the hot pipe, which effectively limits conductive heat loss. Second, since the overlapping cups were originally intended to withstand the temperatures of boiling water, they're not likely to be melted by hot pipes.

HOW TO PROCEED

Gathering enough used cups to insulate an entire heating system at one time can be quite an undertaking, since about two dozen containers are required for each running foot of pipe. So I decided simply to add to my pipe wrappings as the cups became available. (The bulk of those that I've used to date were picked up from the highways and byways, where they form omnipresent —and regrettably *durable*—debris.) I graded them roughly according to capacity, and employed different sizes on different pipes.



Before you install this recycled litter, however, you'd better soak the cups in water and give them a quick rinse . . . to prevent your cellar from smelling like a coffeepot whenever the heat comes up. Then cut a circular hole in each cup's bottom to fit the pipe on which you're going to hang it, and make another slice *from* the hole, across the bottom, and up the side to the rim. (The material is easy to cut if your knife is sharp.)

POP 'EM ON

By spreading the cut side open and twisting the container a bit, you can pop the insulation over the pipe without any difficulty. And, if the cup is spread open so far that it cracks, a bit of tape will save it. In fact, at first I placed a short piece of tape across every cut side after installation . . . before I realized that the precaution was unnecessary. As you put the cups in place, though, it's best to stagger the cuts to prevent their alignment.

Quite frankly, when I look at those rejected coffee cups marching down the pipes in my basement and know that I'm recycling a discarded petroleum-based product to cut down on my fuel oil bill, I feel a great deal of satisfaction!

DEAR MOTHER,

Bob Duhsé's recent article, "Uncle Sam, Your Friendly Auctioneer", in MOTHER NO. 84 (page 92) presented a lot of good information for readers interested in taking advantage of U.S. Customs sales. Unfortunately, it also contained an error that could (and probably already has) led to some frustration. Mr. Duhsé said that in order to be eligible to participate in customs auctions, you need to have your name put on a "mailing/registration list", and that by doing so, you'll automatically receive auction announcements for one year . . . at which time you'll have to *renew* your place in order to stay on the bidder list.

While customs districts vary in the frequency and in the procedures of holding auctions, *none* of them have ongoing "mailing lists" for bidders. District directors will be happy to send out information on upcoming auctions, provided you send in a self-addressed, stamped envelope for *each* auction. To determine the frequency of auctions in any customs district, write the district director, telling him or her that you wish to participate in the auctions and requesting to be notified as to how often they are held (in many cases, once each month).

Jerome Hollander
Public Affairs Officer, Pacific Region
United States Customs Service
Los Angeles, Calif.

In issue 81's Dear MOTHER column, Max Flandorfer asked how to find a key-wound shaver. Well, Max can end his search for the nonelectric beard trimmer by sending $12.95 (including shipping and handling) to H & H Import-Export, Dept. 50-5-TMEN, 30941 Agoura Road, Suite 124, Westlake Village, California 91361.

Mike Pace
Pier Pont, Ohio

Those people wanting information about solar energy applications may be interested in Red Rocks Community College, which is located on the west side of Denver between Lakewood and Golden, Colorado. Our school has a two-year program in which a student can earn an associate degree in applied science with a major in active solar installation and maintenance or one in passive solar design. Students may also take courses of interest in a particular subject instead of working toward a degree. All in all, we have more than 30 specific courses in the sun-energy field, plus allied vocational courses. Classes include theory as well as some hands-on work in installation and construction. If anyone would care to have further information, please call us at 303/988-6160, ext. 369 or 367, or write to us at the address that follows.

Robert Vick, Solar Instructor
Red Rocks Community College
Building and Machine Trades,
Solar Department-TMEN
12600 W. Sixth Ave., Box 19
Golden, Colo. 80401

I attend classes at the Red Wing Energy Education Center in Red Wing, Minnesota. The school offers two-year vocational programs in solar technology, wind energy, biomass energy, energy conservation, and alternative energy technology. (Indeed, the graduating wind-energy students have been in great demand.) It hopes someday to be accredited as a college. If anyone is interested in attending this school, please write to the Red Wing Energy Education Center, Dept. TMEN, Highways 61 and 19 West, Red Wing, Minnesota 55066.

Edward Nobach
Red Wing, Minn.

The loss of Wilson Clark, the environmental/energy specialist who died in a car crash when he swerved to avoid hitting a deer, is lamentable. Perhaps this tip can help others avoid a similar fate. A deer tends to veer away from any dark object chasing it. Since its shadow—cast by the headlights of an approaching vehicle—is no exception to this rule, the animal will often turn *toward* the oncoming car. The way to change such an encounter from dangerous to merely scary, then, is to turn off your lights and blow your horn. The deer will decamp in the opposite direction with amazing speed (so you can turn your lights back on again almost immediately). Using this idea while traveling Wisconsin and Minnesota roads, I've experienced many scares . . . but no hits.

Norman A. Weston
Minneapolis, Minn.

Your long-awaited article about composting toilets (MOTHER NO. 80, page 172) was most interesting and practical. However, my particular problem wasn't addressed: finding a composter that can be used at a remote site without city power. I'd appreciate hearing from readers who know of a commercial unit that either requires no power or runs on 12 volts DC, or who have solved this problem with a homebuilt composter. I'm also hoping to avoid the hassle and expense of a septic tank by either building or buying a gray-water treatment system. The experience of anyone who has presented such a combination to health departments (especially in the state of Washington) would be quite useful to me.

Chris Caldwell
Orangevale, Calif.

Perhaps our solar-powered toilet on page 104 of this issue will be of some use to you, Chris!—MOTHER.

As a service to those readers who may not be able to obtain the Grainger IP929 submersible parts-washer pump called for in "Build Your Own Parts-Washing Tank" (MOTHER NO. 81, page 166), I am prepared to ship the pumps anywhere in the continental United States. The list price is $56.60, and California residents should add 6% sales tax. Please add $2.50 for UPS.

Bill's Saw Service
Dept. TMEN
2019 Baldwin Ave.
Oroville, Calif. 95965

I read your article "Drown Those Fleas . . . and Ground Those Flies!" (MOTHER NO. 82, page 22) with great interest. Our house contains nary a pet . . . but it became infested with fleas last spring. What's more peculiar, they collected only in the kitchen, even though the rest of the house is carpeted. Well, we sprayed, fogged, bombed, vacuumed assiduously, took out the insulation beneath the floor, and finally tore up the linoleum! None of these extreme measures was as effective as the simple tactic you recommended: setting up a plate of sudsy water with a light hovering above it. I estimate that we drowned more than 6,000 of the critters by this method.

Beth Rutter
Monteagle, Tenn.

I have a problem that MOTHER might be able to help me with. I'm in prison in Florida and would love some pictures of the out-of-doors. I really like the North Carolina mountains, and northern Michigan is beautiful in any weather. Well, this is my dilemma: I don't have the money to buy pictures, but I'm pretty good at leatherworking. Maybe someone would like to strike a swap . . . for instance, $20 worth of nature for a purse . . . a wallet . . . a hand-tooled picture frame? The possibilities are endless! All mail I receive will be answered. There must be nature lovers out there who can appreciate how I'm feeling!

William C. Alexander #079356
Dept. TMEN
P.O. Box 488/G-18
Polk City, Fla. 33868

(continued on page 172)

Wealthy Man Wants to Give You His Wealth Secret Before It's Too Late!

Dear Friend,

My name is John Wright. Not too long ago I was flat broke. I was $30,000 in debt. The bank repossessed my car because I couldn't keep up with the payments. And one day the landlord gave me an eviction notice because I hadn't paid the rent for three months. So we had to move out. My family and I stayed at my cousin's place for the rest of that month before I could manage to get another apartment. That was very embarrassing.

Things have changed now. I own four homes in southern California. The one I'm living in now is worth more than half a million dollars. I own several cars, among them a brand new Mercedes and a brand new Cadillac. And as of now, I have $178,000 cash in certificate of deposits in just one of my bank accounts in Beverly Hills.

I'm not really trying to impress you with my wealth. All I'm trying to do here is to prove to you that if it wasn't because of that money secret I was lucky enough to find that day, I still would have been poor or may be even bankrupt. It was only through this amazing money secret that I could pull myself out of debt and become wealthy. Who knows what would have happened to my family and me.

Knowing about this secret changed my life completely. It brought me wealth, happiness, and most important of all peace of mind. This secret will change your life, too! It will give you everything you need and will solve all your money problems. Of course you don't have to take my word for it. You can try it for yourself. To see that you try this secret, I'm willing to give you $20.00 in cash. (I'm giving my address at the bottom of this page.) I figure, if I spend $20.00, I get your attention. And you will prove it to yourself that this amazing money secret will work for you, too!

You probably are asking yourself, why is he sharing his secret with me? My response is, "why not". First, I've already made enough money to retire for the rest of my life. Second, my secret is so unique that we won't be competing with each other. Third, nothing is more satisfying to me than sharing my secret only with those who realize a golden opportunity and get on it quickly.

This secret is incredibly simple. Anyone can use it. You can get started with practically no money at all and the risk is almost zero. You don't need special training or even a high school education. It doesn't matter how young or old you are and it will work for you at home or even while you are on vacation.

Let me tell you more about this fascinating money making secret:

FAST MONEY

With this secret the money can roll in fast. In some cases you may be able to cash in literally overnight. If you can follow simple instructions you can get started in a single afternoon and it is possible to have spendable money in your hands the very next morning. In fact, this just might be the fastest *legal* way to make money that has ever been invented!

ALMOST NO-RISK

This is a very safe way to get extra cash. It is practically risk free. It is not a dangerous gamble. Everything you do has already been tested and you can get started for less money than most people spend for a night on the town.

"WORK" AT HOME

One of the nicest things about this whole idea is that you can do it at home in your spare time. You don't need equipment or an office. It doesn't matter where you live either. You can use this secret to make money if you live in a big city or on a farm or anywhere in between. A husband and wife team from New York used my secret, worked at home in their spare time, and made $45,000 *in one year.*

SIMPLE

This secret is simple. It would be hard to make a mistake if you tried. You don't need a college degree or even a high school education. All you need is a little common sense and the ability to follow simple, easy, step-by-step instructions. I personally know a man from New England who used this secret and made $2 million *in just 3 years.*

AGE DOESN'T MATTER

You can use this secret to make money no matter how old or how young you may be. There is no physical labor involved and everything is so easy it can be done whether you're a teenager or 90 years old. I know one woman who is over 65 and *is making all the money she needs* with this secret.

NO PERSONAL SELLING

When you use this secret to make money you never have to try to convince anybody of anything. This has nothing to do with door-to-door selling, telephone solicitation, real estate or anything else that involves personal contact.

LEGAL AND HONEST

Everything about this idea is perfectly legal and honest. You will be proud of what you are doing and you will be providing a very valuable service.

NO LONG HOURS

It will only take you two hours to learn how to use this secret. After that everything is almost automatic. After you get started you can probably do everything that is necessary in three hours per week.

I know you are skeptical. That simply shows your good business sense. Well, here is proof from people who have put this amazing secret into use and have gotten all the money they ever desired. Their names are not mentioned here in order to protect their privacy but I have full information and the actual proof of their success in my office.

PROOF

- A woman from Oregon started out by using my secret method in its simplest form. She later reported that it had brought her $14,000 *in cash.*
- A man from Rhode Island applied my secret and with the help of his family, made over $40,000 *in a year* in his spare time.
- A man from California, who was broke at the time, tried my secret and made $147,000.
- On the basis of my secret, a husband and wife team from Virginia grossed over $100,000 *cash in eleven months.*
- A man from California made over $265,000 *in one year,* with this incredible secret.
- I talked to a man from Ohio, who now lives in Santa Monica, CA. He said: "Thank you for sharing your secret...with this amazing, yet simple secret, I received $220,000 *in just two months.*"

As you can tell by now I have come across something pretty good. I believe I have discovered the sweetest little money-making secret you could ever imagine. Remember — I guarantee it.

Most of the time, it takes big money to make money. This is an exception. With this secret you can start in your spare time with almost nothing. But of course, you don't have to start small or stay small. You can go as fast and as far as you wish. The size of your profits is totally up to you. I can't guarantee how much you will make with this secret but I can tell you this — so far this amazing money producing secret makes the profits from most other ideas look like peanuts!

Now at last, I've completely explained this remarkable secret in a special money making plan. I call it "The Royal Road to Riches". Some call it a miracle. You'll probably call it "The Secret of Riches". You will learn everything you need to know step-by-step. So you too can put this amazing money making secret to work for you and make all the money you need.

To prove that this secret will solve all your money problems, I'm not even asking you to send me money. Instead, postdate your check for a month and half from today. Obviously it is not actually money because it is not negotiable for 45 days. You can easily stop payment on it any time you want. I can't cash your check for 45 days before I know for sure that you are completely satisfied with my material.

IMAGINE HOW YOUR WHOLE LIFE WILL CHANGE IF YOU USE THIS SECRET TO GET ALL THE MONEY YOU NEED!

- You won't have to worry about bills.
- You will be master of your own time and fate and nobody can boss you around.
- You will have more time to spend with your loved ones and you will be able to take care of them in emergencies.
- You can have the house you want, the car you want, the vacations you want.
- And most of all, you will finally have PEACE OF MIND!

If you need (or just want) more money, there are a lot of reasons why you should take advantage of this amazing secret. (And I can't think of a single reason why you shouldn't). It will probably solve all your money problems forever. In fact, I am so completely convinced that my powerful secret works money miracles, that I'm willing to give you the most unusual *guarantee* ever offered. That is, if it doesn't solve all your money problems, I'll return your original uncashed check, plus an *extra twenty dollar cash bonus* just for doing me (and yourself) the favor of giving the secret an honest try according to my simple instructions.

$20.00 FREE!

There is no way you can lose. You either solve all your money problems with this secret (in just 30 days) or you get your money back *plus* $20.00 *in cash* **FREE**!

Do you realize what this means? You can put my simple secret into use. Be able to solve all your money problems. And if for any reason whatsoever you are not 100% satisfied after using the secret for 30 days, you may return my material. And then I will not only return your original UNCASHED CHECK, but I will also send you an *extra $20.00 cashiers check* just for giving the secret an honest try according to the simple instructions.

I GUARANTEE IT! I have given references, therefore, there is absolutely NO RISK ON YOUR PART.

To order, simply write your name and address on a piece of paper. Enclose your postdated check or money order for $12.95 and send it to:

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TS AND PIECES... BITS AND PIE

SCREENING OUT VDT RISKS: The flood of computers in the workplace has been followed by an almost equally large wave of medical complaints from the users of video display terminals. While the debate over health hazards from such equipment still rages, one company has stepped forward with Somashield, a transparent screen that fits onto a computer (or television) and reportedly blocks up to 99% of the low-level radiation. To find out more about the device (which costs from $50 to $150 depending on the size), write to Design West, Dept. TMEN, 2532 Dupont Drive, Irvine, California 92715.

LLAMA PRICES SOAR: A few years back, when MOTHER first advocated llama raising as a profitable enterprise (see issue 66, page 90), the male animals cost between $400 and $1,000, and the she-llamas could be had for $2,500 to $3,000. It looks now, though, as if profitable was an understatement. A recent economic newsletter informed investors that the woolly creatures are now fetching up to $10,000 each!

GLOBAL FARE: The World Development Forum has found that most of humanity's nourishment is provided by a mere dozen kinds of plants: corn, rice, wheat, sugar beet, sugar cane, cassava, potato, sweet potato, common bean, soybean, coconut, and banana.

HOT TUB CAUTION: A major medical journal reports that contaminated water in improperly maintained hot tubs and whirlpools can cause urinary infections or even life-threatening pneumonia among bathers. Although the number of reported cases of such illnesses remains small, doctors emphasize the importance of checking chlorine levels and filtering systems in the baths.

A-PEELING INSECTICIDE: University of Georgia scientists have discovered that oil from citrus rinds can be used as a potent bug-killer. The researchers say that if further testing of the fruit skins goes well, "wastes" that the juice industry usually discards by the ton could be turned into an insecticide that's safe for pets, livestock, and even humans.

NUCLEAR FRIEZE: Justine Merritt of Denver, Colorado is hoping that her frieze (a richly ornamented banner, often used to decorate buildings) will contribute to the nuclear armistice . . . "peace by peace". She's inviting people across the country to help put together a giant ribbon—decorated with expressions of concern and hope—to be draped around the Pentagon building in August 1985 (40 years after the bombings of Japan). If your own family would like to consider contributing a panel, write to The Ribbon, Dept. TMEN, P.O. Box 2206, Denver, Colorado 80201.

SODIUM DOWN THE DRAIN: If you are trying to cut your sodium intake but find that commercially available "low salt" products are prohibitively expensive, you'll be interested in this piece of scientific common sense from researchers at Duke University Medical Center. The scientists found that a one-minute rinsing with regular tap water washes almost 80% of the sodium from the water-packed tuna . . . and renders cottage cheese more than 50% salt-free. Although a bit of the food's flavor and calcium is also lost through this process, its protein content remains the same.

RADIOACTIVE BUGS: According to the Chicago Sun-Times, the Energy Department found that the gnats, mosquitoes, dragonflies, and honeybees living around ponds at the Oak Ridge National Laboratory were contaminated with radiation. Despite the fact that even the bees' honey is slightly radioactive, the department maintains that the insects are not harmful to humans.

ACID RAIN MAKES THE NEWS: Maine TV-viewers can tune into weekly reports on acid rain along with the local weather forecast . . . thanks to a National Wildlife Federation affiliate that developed an index used to measure rainfall acidity. The NWF is hoping that the television reports will spread to other states, and help increase public awareness of the problem.

KUDZU COMPOST: Once the stubborn kudzu vine takes hold, it's close to impossible to get rid of. But Charles Wilber of Crane Hill, Alabama simply harvests the prolific plant on a regular basis . . . so he can turn it into an organic fertilizer with which he grows 18-pound radishes and 9-3/4"-round strawberries. Charles says it takes the kudzu about three months in a wire bin—he turns it over every few days—to turn into the magical fertilizer.

CLEANING UP: Here's more evidence that a healthful environment and a healthy economy can go hand in hand. As reported in the Audubon Leader, the Environmental Protection Agency assessed the time and wages lost because of chronic illnesses brought on by dirty air, and discovered that if air pollution levels were reduced by 60%, the U.S. would benefit to the tune of $36 billion a year!

THE U.S. HAS THE SECOND HIGHEST TEENAGE-PREGNANCY RATE in the developed world. . . . 12 MILLION GALLONS OF USED CRANKCASE OIL WERE COLLECTED IN MARYLAND in 1982 through the state's Used Oil Recycling Program. That's no trivial feat when you consider that—as found in a Virginia study—ONE QUART OF IMPROPERLY DISCARDED OIL CAN CONTAMINATE 2 MILLION GALLONS OF WATER. . . . According to the World Health Organization, about 80% OF ALL DISEASE IS CAUSED BY UNSAFE DRINKING WATER AND INADEQUATE SANITATION. ●

MOM'S GARDENING APPRENTICESHIPS

Many visitors to our Eco-Village have been moved by our beautiful, wholistically tended gardens . . . *and* many times—as on page 64 of this very issue—we've tried to share some of our growers' hard-earned wisdom in the pages of this magazine. But useful as such viewing and reading can be, there's really only one way to learn organic, biodynamic/French intensive gardening: by *doing* it.

And that's why we're offering you this opportunity. Would you like the chance to increase your horticultural skills . . . through the experience of working with MOTHER's own Eco-Village gardeners? If so, you should consider applying for one of the places in our Gardening Apprenticeship Program.

MOM's large gardens contain cold frames, greenhouses, berry patches, a young fruit orchard, field crops, and more than 100 4′ X 30′ double-dug beds (home for a multitude of different vegetables and flowers) . . . so there are plenty of learning experiences —and work—to go around!

Our horticultural training is essentially a learn-as-you-work situation. So if you become one of our apprentices, you can expect to be involved in all aspects of gardening labor . . . with each day's tasks being appropriate for the season and the weather. There are no formal classes, though each new job will be carefully explained and demonstrated.

Your program will cover the culture of vegetables, flowers, herbs, berries, and orchard fruits . . . and can also include some experience with field crops, small-scale animal husbandry, and beekeeping. But what you get out of the situation will ultimately depend on *you* more than on us . . . the depth of your learning will reflect your own motivation and willingness to work hard.

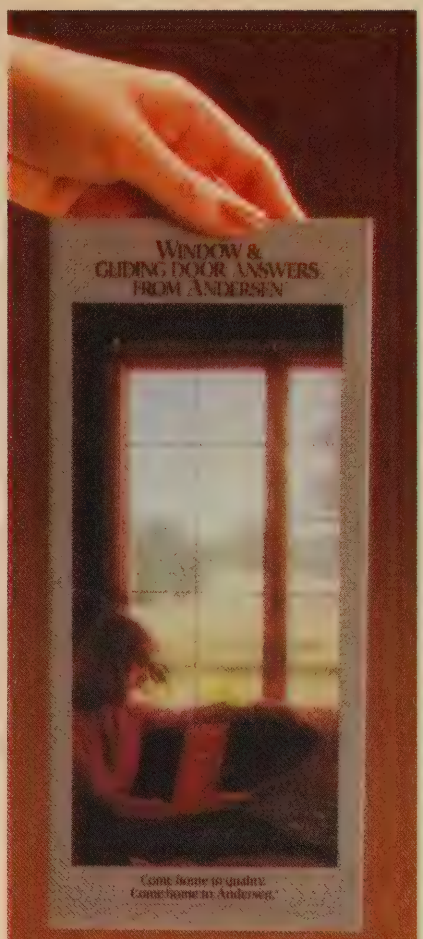
If you are accepted as an apprentice, you'll live out at our Eco-Village in western North Carolina and receive housing (a private or shared room) . . . access to cooking and bathing facilities . . . and—naturally—plenty of the fruits and vegetables of your labor. In addition, if you stay beyond three months, you'll get a small monthly stipend. To receive more information about the details of this program, write to Garden Apprenticeships, 316 Gordon King Road, Pisgah Forest, North Carolina 28768.

Perhaps Alan Chadwick, the founder of the biodynamic/French intensive method, best described the virtues of such a "tutorial" situation:

"I've found that the students, children, and adults who work with me can come to understand [that instead] of my telling them to do this and that—instead of my forcing them to learn names and procedures—I've been sometimes able to help them discover secrets. And the garden is *all* secrets, the whole miracle of the garden is made up of secrets, and I've been granted the chance to expose a few others to this incredible 'thing' which, *itself*, is the teacher.

"It is, you see—though many people seem to find the idea amusing—the *garden* that makes the *gardener*." ●

STAFF PHOTOS



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THE PLOWBOY INTERVIEW

ANDREW SAUL:
YOU CAN BE YOUR OWN DOCTOR

"If we learn more than the doctor in areas of value to our health, it is our duty to apply this knowledge to the betterment of ourselves and our families. We need total health more than medically approved health."

So says 28-year-old Andrew Saul in the opening chapter of his manual Doctor Yourself. *Saul is, it seems, engaged in a struggle to expand the frontiers of the medical self-care movement . . . taking the radical view—even in the eyes of some longtime self-help advocates—that a person who lives a truly healthful life should almost never* need *the services of medical professionals. In the process of spreading his message, Dr. Saul (he's not an M.D., but rather a doctor of naturopathy, a title recognized in several states and widely accepted in Europe) managed to become the* first *person certified by New York State to teach naturopathic healing and health-maintaining techniques . . . established the Ashwins Health Institute in Hamlin, New York . . . set up a charity vitamin dispensary for the poor in nearby Rochester . . . and published a shopper's guide to healthful supermarket foods, a how-to manual aimed at helping people through their first body-cleansing fast, and the book* Doctor Yourself. *Along with all that, he has still found time to teach classes at the State University of New York at Brockport, bombard local newspapers with alternative medical information, and generally make every effort to bring his message of natural health care to as many people as he possibly can.*

In fact, Andrew Saul first came to MOM's attention while he was teaching a series of courses at last summer's Community of Homesteaders' Good Life Get-Together in Naples, New York. Once the MOTHER staffer who visited the festival saw that Dr. Saul's presentations were progressively better *attended as the days went on, he sat in on one himself . . . and quickly became convinced that the outspoken naturopath's ideas merited sharing with our readers.*

So MOTHER sent Bruce Woods to visit Dr. Saul at the Ashwins Health Institute for an in-depth discussion. Mind you, by presenting their conversation (in edited form), we are not necessarily endorsing *Dr. Saul's ideas, and—more important—we're certainly not trying to convince anyone to avoid traditional medical care. However, we did indeed find Saul's words to be a stimulating challenge to our own ideas of self-health responsibility. And by sharing his thoughts and providing access information on pertinent books and medical studies, we hope to help you, our readers, to be better able to make wise decisions on questions pertaining to your own health and that of your families. After all, there are not many* other *situations in which finding the right answer can be so vital.*

PLOWBOY: Dr. Saul, you've made a name for yourself in the field of alternative medicine at a fairly tender age. That leads me to believe that your interest in medical alternatives goes back a goodly number of years.

SAUL: Well, in essence, I was drawn into natural healing because I found that regular healing didn't work. And I suppose the *seeds* of that realization were sown when I was a child. Like everybody else, I had the usual injections, and then I went overseas and had more shots, and I ate meals based on the so-called four basic food groups (again like everybody else), and I got *sick* like everybody else. Not all the time, of course, but often enough.

Now, my "conversion", if you can call it that, was a very slow process . . . I more or less backed into the alternative health field. You see, I was still intending to go into traditional medicine when naturopathic healing was introduced to me by Professor John Mosher at SUNY at Brockport, where I was enrolled in a premed program. Dr. Mosher challenged me on one simple point. He said, "If you really want to help people, why don't you at least *investigate* the natural healing techniques as well as those of conventional medicine. Let the merits of each system tell you which is best." So I began looking into the subject, and the book that turned me around was Aubrey Westlake's *The Pattern of Health*. It's a rather unspectacular-looking paperback, but it's probably the most important volume I've read in the last 12 years. Westlake was an experienced English M.D. who had also backed into natural healing, so I could easily relate to what he had experienced. Briefly, he felt that, after 40 years as a physician, he'd spent too much of his time just bailing out leaking boats. He was frustrated by his inability to get down to causes . . . to promote self-help and to effect practical, deep-down cures. *The Pattern of Health* is the story of his discovery of alternative healing techniques. That book inspired me to read more on the subject, and one thing led to another. I soon started using basic naturopathic methods myself—such as fasting, switching to a vegetarian diet, and taking vitamin supplements—and I actually started feeling better.

STAFF PHOTO

PLOWBOY: Were there any *other* experiences that contributed to your disillusionment with standard medicine?

SAUL: Well, when I observed my first surgeries, I found that I wasn't particularly enamored with the idea of cutting out someone's adrenal glands, or otherwise "invading" the person's body, in the hopes of achieving a desired end, one that often wouldn't come about. But the conflict between my medical career and my "sideline" research into alternatives really became intense while I was studying in Boston.

PLOWBOY: Was that at Brigham Hospital?

SAUL: The Peter Bent Brigham Hospital, yes. Now don't get me wrong: That institution's staff members are very good at crisis medicine. But as far as knowing what kind of *diet* will help a person back to health . . . well, let's just say that I was amazed to see people who had diverticulitis or who'd just had a colostomy getting white bread, soda pop, overcooked vegetables, tiny little salads, slabs of overcooked meat, and *no* vitamin supplements at all. These were individuals who had been through grueling surgery—sometimes people who were dying—and this lack of nutritional care nailed home the point that orthodox medicine is sometimes wrong. Those who practice it often *don't* know what they are doing.

However, I also had to begin to ask myself whether I really knew what I hoped to be doing. And that concern led me to a great source of information. I started reading reprints produced by the Lee Foundation for Nutritional Research and found it to be an excellent outlet for good, hard medical and nutritional information. Better still, these reprinted articles are right out of the mainline medical journals . . . including *Clinical Physiology*, the *Journal of Applied Nutrition*, the *Journal of the American Medical Association*, and the rest. The foundation has simply reprinted features that describe instances in which drugs do not work, and others that demonstrate how vitamins and foods *can* cure real diseases.

And that was what I needed to see . . . reports by *doctors* who'd worked with medical alternatives. At that point there was no turning back for me, because I was faced with overwhelming evidence . . . data provided by medical doctors, by researchers, by Ph.D.'s, and by leaders in their fields. I'd discovered a tremendous amount of material and I'd begun to see that nature cure was *not* just a questionable method of treating the common cold, but that it could also be used for cancer, encephalitis, meningitis, pneumonia, polio, diverticulitis, and other terrifying diseases.

PLOWBOY: Yet although you received your doctorate in naturopathy in 1976, you weren't able to actually *use* it until 1980.

SAUL: Yes, I was able to open the Ashwins Health Institute only after an uphill battle. Professor Mosher, an accountant named Keith

(continued on next page)

(continued from preceding page)
Taylor, and I began the process by filing for nonprofit corporate status. To do so, we had to obtain the approval of the state attorney general. And, as you probably know, natural healing is not yet considered legitimate medicine in New York State (but it is accepted in some others . . . including Oregon, Washington, and California).

At any rate, the attorney general approved us without question, and our next step was to approach the New York State Education Department, which actually licenses physicians in New York. We assured that organization that we weren't going to practice medicine or grant M.D. diplomas. So the Education Department approved us in short order, at which point we had to get an OK from the county supreme court. Once that was obtained, the state granted us, after some months, our nonprofit status. *Then* we asked the Internal Revenue Service to verify and underline what the state had done, *and* to grant us a tax exemption so that our donors' contributions would not have to be split with the government and could be applied, in total, to the services that we hoped to provide . . . the charitable vitamin dispensary that we now run, for instance.

This application turned into yet another round of forms and letters. Eventually, however, the IRS granted us tax-exempt status. I do believe that the whole process was worthwhile, though, because when a client or student comes to see me, he or she wants to be assured of dealing with a recognized and reputable professional. I'm always careful to point out that I'm certified by the state of New York to teach what I'm teaching.

> *A person really* can *choose to get well or to stay sick . . . and it's shocking to me that many people choose illness.*

PLOWBOY: This would probably be a good time to give a working definition of naturopathy.

SAUL: Well, first of all, naturopathy could also be called *nature cure*, *natural healing*, or even *natural therapeutics*. Nature cure is very different from standard—or *allopathic*—medicine, because a naturopath does not use drugs and doesn't perform surgery.

Now the first question one might ask upon hearing that is "Well, then, what on earth *do* you do?"

To answer that, I have to admit that there are a number of naturopathic approaches. Natural healing is a highly diverse field. However, rather than limit myself to any one of these schools of thought, I believe in using sort of a team approach . . . that is, employing many such methods in concert. I'm interested in results rather than "pet" theories. All I want to see is people getting better, and any technique that they can use to get results is fine with me.

Furthermore, nature cure almost always is safer than allopathic medicine. After all, a healthful diet is probably the keystone to *any* form of naturopathic therapy. And there are no unpleasant side effects of eating right.

PLOWBOY: It would seem that you're saying the patient bears the responsibility for his or her own health, then.

SAUL: Exactly. A person really *can* choose to get well or to stay sick . . . and it's shocking to me that many people choose illness. I often tell folks that everybody has the *right* to be sick. And I'm not being flippant when I say that! If a person really wants to get well, he or she won't mind making a change of lifestyle . . . or taking *whatever* course of action will help him or her get better.

If an individual wants to get well enough, or perhaps I should say if a person wants to get well, *enough* . . . he or she will be willing to take such steps. In fact, my most successful students often tend to be just a bit desperate and discouraged . . . and that combination can sometimes yield remarkable results. Many people do their best work when their backs are against the wall.

PLOWBOY: Why is it that nature cure has such a limited acceptance in this country? Isn't it far more generally recognized overseas?

SAUL: Naturopathy is downright *mainstream* in many other countries. In Germany, for example, naturopathic healers are abundant. Furthermore, there *was* a time when nature cure practitioners were far more common in the U.S. In Florida, for instance, two sister bills were passed in 1927: the Naturopathic Practice Act and the Medical Practice Act. In those days, naturopaths and medical doctors often worked side by side. But by 1959, the nature cure practitioners were no longer being licensed, while, of course, the M.D.'s are to this day.

The official reason for such "precautionary" restrictions is to protect people from quack therapies. And many individuals *have* been taken in by treatments that are statistically invalid. Unfortunately, orthodox medicine leads the league in the use of statistically invalid approaches to human illness. One has only to read Ivan Illich's *Medical Nemesis* to verify that medicine not only is without statistical significance in many cases, but also is sometimes definitely harmful. One out of five people admitted to a typical research hospital today will acquire an iatrogenic—or doctor-caused—disease!

PLOWBOY: Can you cite some well-documented clinical evidence of the effectiveness of nature cure?

SAUL: Yes, a great deal of it. You have only to go to the *Journal of Applied Nutrition*, to the *Journal of the Franklin Institute*, to *Clinical Physiology*, to *The Lancet*, or to any of the many excellent British and German journals to find that such techniques are well established. For instance, in 1950 Dr. Benjamin P. Sandler, a United States Navy physician, then at the Mayo Clinic, treated tuberculosis—and did so more effectively than anyone *else* at that clinic at the time—using nothing but a high-protein, low-carbohydrate diet.

Then too, Dr. William J. McCormick of Toronto, Canada has—since 1946, at least—been using high doses of vitamin C (ascorbic acid) to treat herniated or ruptured disks, as well as a variety of infectious childhood illnesses. Or how about Dr. Frederick Robert Klenner of Reidsville, North Carolina? For 45 years he's been using vitamin C as an antibiotic, an antitoxin, and an antihistamine. He's employed it, with success, against polio, meningitis, tetanus, encephalitis, and a number of other serious diseases. This man is giving *injections* of vitamin C, and reported—in *A Physician's Handbook on Orthomolecular Medicine*—that vitamin C is the most useful therapeutic substance available to the doctor.

Klenner suggests that when an M.D. admits a patient to the hospital, the first thing he or she should do is to administer vitamin C while deciding what other course of action to take. In many cases, the physician won't *have* to do anything else . . . because the vitamin therapy will cure the condition. Why, high doses of vitamin C can even be a beautiful treatment for infected cows. I worked on a dairy farm for a while before I started practicing, and helped inject doses of a million or more units of antibiotics to cows with mastitis. Yet if farmers would give their milking stock 20,000 to 30,000 milligrams of vitamin C and eight ounces of cider vinegar a day, the animals wouldn't have mastitis problems.

Colds, cancer, bronchitis, pneumonia, herpes, meningitis, encephalitis . . . how, people ask, can one vitamin cure so many different illnesses? The answer is that the *lack* of one vitamin can *cause* many different illnesses.

PLOWBOY: Hold on there. Are you saying that you know of people who've achieved a complete and total remission of *genital herpes* as a result of vitamin therapy?

SAUL: Yes, that's the proper term for it . . . complete and total remission. The specific form of vitamin C used was calcium ascorbate, in conjunction with sizable doses of L-lysine, a magnesium supplement, and a vegetarian diet. The amount of calcium ascorbate may exceed 40,000 milligrams daily. And yet, proportionate to body weight, that's no more vitamin C than a sick rat would manufacture!

PLOWBOY: Right. Rats, goats, and many other animals produce vitamin C in their bodies, and the amount varies with the creature's health.

SAUL: Yes, a healthy rat may manufacture the equivalent of a human dose of 6 grams a day. A sick rat—or goat—will manufacture a good deal more.

Vitamin C is inexpensive . . . has broad-spectrum utility . . . is effective . . . *and* is safe. Yet it gets absolutely no significant attention from the medical community. Perhaps that's because physicians don't believe that anything cheap, safe, and generic *could* work.

PLOWBOY: And, of course, it's also available without a prescription.

SAUL: That's precisely why vitamin C appeals to *me*, because I'm trying to promote *radical* wellness self-reliance. By that I don't mean that people should just learn when to go to the doctor or how to avoid mixing their medicines. Such concepts are little more than grade

school-level medical self-reliance. I want people not only to know what type of approach might help them, but also to be able to take the appropriate action and get results, totally on their own. People no longer *have* to suffer.

PLOWBOY: And it was to spread the word about such health care that you came out with your self-published book, *Doctor Yourself* . . . which I believe you've called a "health homesteader's handbook".

SAUL: The purpose of *Doctor Yourself* is to describe—in simple, practical, immediately useful terms—12 ways people can improve their own health.

PLOWBOY: But how do you convince them that they have the *capability* of managing their own health?

SAUL: The book addresses that fear right off. The first chapter explains that it's easy—and safe—to be your own doctor . . . *if* you know how. The *absence* of knowledge is what should be feared.

PLOWBOY: Well, how can a person obtain the necessary knowledge? What sorts of materials are available to the public?

SAUL: *Doctor Yourself* lists about 140 readily available books and articles, and that's by no means intended to be a complete bibliography. However, the Lee Foundation for Nutritional Research should be the *first* source a person investigates. *[EDITOR'S NOTE: See the access list accompanying this interview.]* I'd even go so far as to suggest that anyone interested in self-care get one copy of every reprint and book the foundation publishes. These would prove to the person, as much as anything *can* be proved by written material, that "real" doctors do cure diseases with nutrition . . . with fasting . . . with vitamins . . . and with minerals.

Then again, people can simply go to their local libraries, and even to *medical* libraries—no one's going to throw them out—and research any disease that they'd like to understand. I'd also suggest visiting a pharmacy, borrowing the establishment's copy of the *Physician's Desk Reference for Prescription Drugs*, and reading enough of it to appreciate how dangerous many drugs are and how little is known about the majority of them. Yet another valuable source of information is the *Merck Manual*. It's a 2,400-page medical text, and it sells for about $12. That's almost like getting four years of medical education for $12!

PLOWBOY: It sounds like quite a bargain.

SAUL: Yes. This is a book that practically every physician has on his or her desk, and one that every health homesteader should have, too. Now, you might well ask, do I really believe people are going to go through this volume and learn everything they need to know? Certainly not. In fact, I think much of the information in the *Merck Manual* concerns ways of approaching illness that I'd disagree with. But the book does at least correctly describe symptoms and conventional treatments. It will let a reader know what the *medical* approach to a specific problem would be.

I also highly recommend *Dr. Schuessler's Biochemistry* by J.B. Chapman, M.D. The 168-page book lists the 12 Schuessler cell salts and tells exactly how to use them . . . it's doubly cross-referenced . . . and it's probably the most valuable single medical book for the home I've ever seen. *[EDITOR'S NOTE: The 12 Schuessler cell salts were categorized, in 1873, by the German biochemist whose name they bear. Many naturopaths believe they can be used to relieve disease by restoring the minerals missing in the affected tissue.]*

The next book that belongs in the health homesteader's library is *Boericke's Materia Medica*, ninth edition, by William Boericke. This 1,000-page volume, a detailed presentation of homeopathic theory and treatment, will set you back about $20.

The possible additions to this list are, of course, about as numerous as the world's diseases. But it's safe to say that you could make a good "tool kit" with six or seven books . . . six or eight herbs . . . a very big bottle of vitamin C . . . some good multiple vitamins (everyone should, I think, take a high-potency natural multiple vitamin a day) . . . and a few other basics.

PLOWBOY: So the tools and the information needed for medical self-care are probably more accessible than most people believe. But aren't there some *legal* implications of doing one's own doctoring?

SAUL: First of all, it's completely lawful to doctor yourself. The Constitution provides for that. You may also treat your immediate family if you—and they—wish. Should you start prescribing for a friend or a neighbor, though, you'd be venturing into legal corridors. And, if you *charge* for treating a neighbor or friend, you are definitely asking for trouble.

Then again, though, I don't *treat* anybody. And I don't diagnose, prescribe, or operate. Instead, I *teach* people how to diagnose and how to treat themselves to get specific results. They may use that education or not . . . it's up to them.

PLOWBOY: I've read that you're opposed to vaccination.

SAUL: Slow down a second. I do counsel people frequently on the pros and cons of vaccination. But I never tell anyone *not* to get shots or *to* get shots. I simply point out the alternatives that are available. Our four-year-old daughter has never had an injection, and our son is no longer getting them, yet both youngsters—lifelong vegetarians—are at least as healthy as the other children in the neighborhood.

PLOWBOY: Even though they're exposed to the many contagious illnesses children encounter in school?

SAUL: Yes. And if you're initially put off by this idea, remember that the unvaccinated child poses absolutely no threat at all to the other children, because the others *have* had their shots. So the only possible complaint can be one of neglect, with the argument that says, "If you don't allow vaccinations, you're injuring that child." But that just isn't necessarily a true statement. The fact of the matter is that many injections—including the diphtheria, pertussis, and tetanus shots—are not without risks of their own. What's more, many vaccines may not be all they're cracked up to be. For instance, there was a medical doctor up in Canada who treated polio with iodine supplements in the 1950's. The method is called iodine prophylaxis, and the effectiveness of his treatments suggests that the popularization of iodized salt has had more to do with the elimination of polio in America than the polio vaccine!

Now I am not saying that there's no statistical significance to results with the Salk vaccine. But I also believe that, on a scale of 1 to 10, it definitely ranks below 2. Whereas I think vitamin C, a vegetarian diet, and iodine will actually prevent polio *more* effectively. Once again, all of the evidence supporting this theory can be found in articles available from the Lee Foundation.

PLOWBOY: Let's say an individual who's reading this interview decides, "Well, this Dr. Saul seems to make some sense, and I know I haven't been taking care of myself as well as I could." Then . . .

SAUL: What should he or she do?

PLOWBOY: Yes. And—to be more explicit—if someone isn't ready to jump into a major lifestyle change with both feet, what initial steps might give him or her enough immediate results to provide encouragement?

(continued on next page)

DR. SAUL'S "OPTIMAL HEALTH REQUIREMENTS" (OHR) FOR VITAMINS COMPARED WITH THE U.S. RECOMMENDED DAILY ALLOWANCE (RDA)

	U.S. RDA	OHR
VITAMIN A	5,000 IU	20,000 IU
B VITAMIN COMPLEX		
Thiamine (B-1)	1.5 mg	75 mg
Riboflavin (B-2)	1.7 mg	75 mg
Niacinamide (B-3)	20 mg	250 mg
Pyridoxine (B-6)	2.0 mg	75 mg
Cobalamin (B-12)	6 mcg	125 mcg
Biotin (B-7)	0.3 mg	0.7 mg
Pantothenic Acid	10 mg	150 mg
Folic Acid	0.4 mg	0.8 mg
VITAMIN C	60 mg	4,000 mg
VITAMIN D	400 IU	500 IU
VITAMIN E	30 IU	600 IU

EDITOR'S NOTE: Dr. Saul informed us of a good source of vitamin C (although he was careful to point out that he wasn't necessarily recommending the other products sold through this outlet). It seems that Bronson Pharmaceuticals (Dept. TMEN, 4526 Rinetti Lane, La Canada, California 91011) sells ascorbic acid vitamin C powder for $15.50 a kilogram, postpaid in the U.S.

(continued from preceding page)

SAUL: Well, the very first thing I recommend is that people stop eating meat.

PLOWBOY: Whoops!

SAUL: I know, I lose a lot of people on this point. But I'm not out to make friends . . . I'm out to tell people what I believe is the *truth*.

Unfortunately, a lot of my students kind of run into a brick wall right there. They are just not *willing* to give up the hot dogs and hamburgers in order to get rid of—say—their arthritis. Well, if they're not ready to drop meat, they should no longer look at themselves as victims of this demon arthritis, but rather as victims of their own stubbornness. This is why motivation is so important. Natural healing works . . . but only if *you* do.

You know, I was in a class once, and I mentioned that rats make their own vitamin C, and someone asked, "Does that mean rats are a good source of vitamin C?" I replied, "Sure, if you eat your rats *raw*. Once you cook the meat, the vitamin C content is almost nil."

I think that's why traditional Eskimos tend to be healthy . . . because they eat raw meat. If they tried to subsist on *cooked* meat, they'd all be seriously vitamin-deficient. People who do eat meat, then, probably should do so the way that true carnivorous or omnivorous creatures do: Eat the whole animal . . . skin, bones, blood, intestines, brains, eyes . . . *everything*.

> *". . . the popularization of iodized salt [may have] had more to do with the elimination of polio in America than the polio vaccine!"*

PLOWBOY: Would that actually provide a balanced . . .

SAUL: It'd be a *perfect* diet. If you completely consume a raw, freshly killed animal, you'll get everything you need . . . all the vitamins, all the minerals, everything. But that's repugnant to us, because, you see, we're *not* meat eaters by nature.

However, to return to my subject, people who do stop eating meat typically find that—for instance—their hay fever isn't as bad, their allergies aren't as severe, or their skin doesn't break out as much. This is due, in part, to the fact that these "new" vegetarians are avoiding all of the chemicals that find their way into meat: the hormones, the antibiotic residues, the colorings, and the preservatives.

On top of all that, when people stop eating meat, they spend less on food. I save $20 a week simply as a result of being a vegetarian. Now that's $80 a month tax free . . . without having to go out and *earn* it. I'm all for that!

PLOWBOY: There are, of course, any number of arguments as to whether humans are, by nature, omnivorous or vegetarian . . . and there are also any number of people who'll give you very convincing evidence pointing one way or the other. However, I suspect that the key here is the *quality* of the meat that people can get nowadays.

SAUL: Look, I'm not telling people that they *have* to stop eating meat. I'm saying that if I were they, *I'd* stop eating meat right away. If they do so, regardless of the validity of one or another of the arguments about mankind's nature, I believe they'll get results. They'll feel better, they'll have fewer illnesses. That's *my* real reason for not eating meat, because a vegetarian diet *works*.

That should hardly come as a surprise. After all, when you buy a cut of beef, for example, you're getting the dead muscle tissue of an animal that's been raised in a highly confined environment *and* on a very limited diet.

PLOWBOY: That environment was probably quite stressful, too.

SAUL: The meat could contain lead if the animal was grazed near an interstate highway, or be doped with antibiotics or other chemical residues. And, on humanitarian grounds, some farming conditions are deplorable . . . those typical of many veal-raising operations, for instance.

PLOWBOY: We recently did an interview with Dr. Michael Fox of the Humane Society of the U.S., and he touched on that. *[EDITOR'S NOTE: See MOTHER NO. 79.]* In fact, he cited evidence that human diseases are developing resistance to antibiotics as a result of the huge quantities of these substances that are given to animals.

SAUL: Worse yet, we're actually starting to see humans contracting diseases as a consequence of eating animals that have been fed "kill-floor scraps", or—as they're commonly called—"meat by-products". Think of it this way: A steer goes to market, and the muscle meats by no means make up the whole animal . . . there's also a lot of waste that is processed into meat by-products. And these substances sometimes include the entire *bodies* of animals that are cancerous or have other diseases that make them unfit for human food. Well, according to a report by Dr. P.F. McGargle—a veterinary surgeon who did meat inspection—published in *Preventive Medicine Forum*, countries in which these ground-up animal by-products are used in livestock food have an unusually high incidence of human cancer. Childhood cancer, in particular, is much higher in countries that use kill-floor scraps when producing feed for hogs, chickens, and turkeys.

Now if you organically raise your own livestock, or if you're a hunter and you get wild game . . . surely that animal had a better chance to get a balanced diet rich in minerals and vitamins—and lived a better life—than did a steer confined to an intensive feedlot. Even so, I still think we should eat the whole animal—*raw*—if we're going to call ourselves omnivorous.

PLOWBOY: What actions *other* than adopting a vegetarian diet would you recommend?

SAUL: If a person is not on insulin or any medication that requires eating, I'd suggest a short fast (four to six days) to rid the body of the toxins accumulated over years of unhealthful living. Fasting, by the way, is also a commonly used naturopathic treatment for certain illnesses.

PLOWBOY: Do you have any tips that might help a first-timer get through a fast? A lot of people are really intimidated by that idea.

SAUL: We have a little brochure called "Techniques for Successful Fasting" that many individuals have found helpful. Basically, it makes the following recommendations: [1] Go into the fast with a positive attitude. Some folks think they're surely going to die if they stop eating. Of course, that's not true, unless they have a health problem such as diabetes and *can't* fast. [2] They should attempt a 50/50 juice/water fast . . . consuming half fruit juice and half water, either mixed together or in alternation.

PLOWBOY: In any amounts that they feel comfortable with?

SAUL: Yes . . . *any* amounts. [3] They should continue their vitamin supplements while fasting. Now some naturopaths say you don't need these "boosters" while fasting—or, indeed, at all, *if* you're eating a healthful diet—but my feeling is that in real life, with its stresses of jobs and kids and traffic jams, you'll find it worthwhile to take vitamins every day.

[4] The next tip is to have a nightly enema during the fast—on any day that you don't have a bowel movement naturally—to rinse out the wastes that accumulate in the bowel and are not being eliminated. Otherwise, toxins will remain in your body when your fast is over. Now I lose a lot of individuals when I recommend that nightly enema, but, again, I'm not out to win buddies.

[5] And the last piece of advice is to come off the fast slowly and gradually. If you fast for four days, take a day or two to come off it. If you fast for six days, take at least two days.

PLOWBOY: Just how does one come off a fast gradually?

SAUL: Stick to fruit salads, vegetable broths, and such . . . and eat half of what you want but do so twice as often as you normally would. If you try all these steps, you'll almost certainly succeed. Most people who have fasted and hated it were on a water fast with no vitamins and no enema.

PLOWBOY: If people do manage to give up eating meat and make their way through the first fast, what should they then consume on a day-to-day basis? What do you feel would be healthful?

SAUL: A two-thirds raw food diet. Or what I prefer to call a two-thirds salad diet. I recommend, for example, an all-fruit breakfast, with some cheese or yogurt, and an all-salad lunch. Try to use sprouts instead of lettuce . . . sprouts are a complete protein while lettuce is not. Then, for supper, eat any meatless menu that you like . . .

(continued on page 22)

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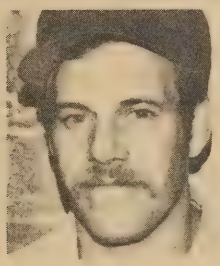

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"About that time I got injured and ended up having to move my family to a different area to take a job as a maintenance mechanic. That idea of controlling my own destiny kept gnawing at me. By now I had five children with extra expense of about $2,400 a year sending the oldest one to a speech and hearing center.

"How could a guy like me save up enough money to start my own business? To get into most businesses you have to own a corner of Fort Knox. If I could only ease into a business without giving up the regular salary I had to count on to put food on the table. And without making any investment. As long as I was dreaming, wouldn't it be great to find something where every single spare time order could bring in *really big* extra money.

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"Quite frankly, my first prospect didn't buy. But I made a call for a school building with a roof the size of a football field. They called it the "Bucket Leaker," because every time it rained they had to put out buckets—in classrooms, hallways, even the cafeteria—to catch the water. I got the job and made $7,700 on it.

"That school building is now leak-free for the first time in 25 years, so they had me do five other roofs with Pace's Seamless Spray. I was on my way. Today my family and I are enjoying a life we never thought possible before—all thanks to my accepting Pace's invitation to return that little coupon in the ad I read."

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(continued from page 20)
going very light on sweeteners and very light on eggs. I also recommend drinking three glasses of raw fruit or vegetable juice a day . . . preferably before meals.

PLOWBOY: What about breads?

SAUL: Whole grain breads can be a very valuable part of any diet. There *are* other ways to get your grains, though. Sprouting your wheat, for instance, is a superb way of getting complete protein.

And this brings us to an opportunity to exercise some real dietary economy. If people want to save money and still feel that they're getting enough protein, they should be sure to have a cereal bowl full of sprouted grain or beans a day. You can grow a whole jarful of sprouts for pennies. In fact, you could *live* on an all-sprout diet for less than $3.50 a week!

> *If you completely consume a raw, freshly killed animal, you'll get everything you need . . . all the vitamins, all the minerals, everything.*

There are people right now who are starving to death in America—many of them are elderly—because they can't live on the $10–$12 a week that they can spend on food. If these people were to eat, say, a diet consisting of half sprouted wheat and half sprouted alfalfa, lentils, mung beans, sunflower seeds, or chick-peas, they would get all of the protein they need . . . all of the vitamins . . . *and* all of the minerals. Then, if a person had just a little additional money, he or she could supplement that all-sprout diet with a daily eggnog . . . the latter being simply a glass of raw milk and a raw egg *yolk* only, with maybe a little sweetener added. That would provide an excellent poverty-level diet. Now I am *not* suggesting that we should all eat that way. I'm saying if I had only $4.00 a week, I could be very healthy on that amount of money.

PLOWBOY: And very bored, perhaps.

SAUL: Very bored, but also very *alive*. You know, it doesn't *cost* much to get good nutrition, but we neglect our need for it. I wonder how many nursing homes even give a high-potency natural multiple vitamin every day?

And simple, easily available vitamins can actually fight drug addiction! I've written to Nancy Reagan and expressed my support for her fight against drug abuse in children. And I told her that our work at the Ashwins Health Institute—in particular our vitamin dispensary that serves the poor in Rochester—has shown us that substance abuse trails off when individuals get adequate vitamin supplements . . . especially B vitamins and vitamin C in substantial quantities. I suggested to Mrs. Reagan that she help develop a national vitamin supplementation program. Unfortunately, all I got in reply was a polite letter from her press secretary.

Yet I've talked to people at St. Joseph's House of Hospitality in Rochester who often seemed to be so drunk they couldn't stand up without my holding them. We get such alcoholics on vitamin C and B complex, though, and those individuals can get *off* the booze. And that means a lot.

More amazing still, in Scotland it's been discovered that people who—in the course of treatment for cancer—were given morphine, or even heroin, can be injected intravenously with ten grams of vitamin C a day, and break the addiction in less than ten days . . . with *no* withdrawal symptoms, maintenance drugs, or side effects!

PLOWBOY: Hasn't it been said that almost 90% of *all* North Americans don't get enough vitamin C?

SAUL: Yes. William J. McCormick, the Toronto, Canada M.D. I mentioned before, did tests on several thousand individuals. He did find that 90% of them were vitamin C–deficient.

That may sound like a shocking statistic, but look at our nearest animal cousin, the gorilla. It's a vegetarian animal . . . one that's anatomically very similar to human beings and one which gets over *six thousand* milligrams of vitamin C a day in its normal diet. Yet the government's telling us that we need (according to the RDA) about one one-hundredth of that amount. Now somebody's wrong, and I'll side with the gorilla and against the government.

Of course, that common human deficiency's very likely why we find that people simply get *better* when they take vitamin C. Statistics and controlled experiments aside, it all comes down to what the individual is willing to do. If any reader of this interview wants to conduct a safe experiment, all the person has to do is start taking the amount of vitamin C that I recommend and see if he or she feels better after a few weeks. *[EDITOR'S NOTE: See the accompanying chart.]* The proof is in the pudding. You can't argue with that, any more than you should ignore Ivan Illich's disclosure that survival rates for the most common types of cancer—those that make up 90% of all cases—have remained virtually unchanged for the past 25 years.

PLOWBOY: Are you saying that all of our new chemotherapeutic drugs have made no progress in treating these cancers?

SAUL: Very little. Let me point out—as Linus Pauling has noted—that the medical establishment has double standards when it comes to vitamins and medicines. A drug may not work all the time, and may even have dangerous side effects, but still be considered a worthwhile risk for a possible success. Whereas if a vitamin doesn't work all the time, but is totally safe, most physicians won't even *try* it.

PLOWBOY: Are there any other easy self-help courses of action that you'd recommend?

SAUL: Well, for one, there's the "spontaneous release by positioning" technique (as developed by Lawrence Hugh Jones, D.O.), which is a method—a first aid technique—for adjusting a person's spine. *[EDITOR'S NOTE: We'll describe this method in detail in our next issue.]*

PLOWBOY: You seem to be sowing a number of self-help seeds, Dr. Saul. What do you hope will result from such work?

SAUL: Most of all, I'd like to see people stop living *with* their illnesses and start living *without* them. I dream of a nationwide system of neighborhood health cooperatives, which will make individuals so self-reliant that they can simply bypass the professionals. And I mean bypass the naturopath *as well as* the medical doctor. Now if someone has a broken leg or is bitten by a rabid dog, for heaven's sake, they'd still have to seek medical help. The secret is not to *never* go to a doctor . . . the secret is to rarely *need* to go.

PLOWBOY: So you believe that every illness is a result of unhealthful living.

SAUL: Basically, yes.

PLOWBOY: How does naturopathic theory explain the existence of contagious diseases?

SAUL: I could probably fill your magazine responding to that question, but I'll try to be brief. First of all, there is no absolute proof that germs are the *primary* cause of any illness. Yes, germs are found at the scene of illness. But then, detectives are found at the scene of a crime, and that fact doesn't mean that they committed it.

PLOWBOY: OK.

SAUL: In fact, many medical doctors have, during the last 150 years, gone on record as saying that they believe the germ theory isn't valid. It certainly doesn't seem to explain cancer very well . . . or heart disease . . . or mental illness . . . or diabetes. At least 20 billion dollars' worth of cancer research hasn't been able to defeat malignancy, or we'd all be vaccinated for it, you can be sure of that.

That's the first basic point. The second is that if we go back to Robert Koch, who formulated Koch's postulates—upon which the germ theory is based—we find that there's a logical flaw in that argument. The first postulate says that you can isolate the germ in a sick animal. The second postulate says you can culture that germ and then—here's the third postulate—inject that cultured germ into a healthy animal and produce the symptoms characteristic of the illness. The fourth postulate states you can then remove the germ from the newly sick animal . . . and it will be the *same* germ, thus proving that the microorganisms caused the disease.

Now that sounds ironclad. But—as Andrew Weil, M.D. points out in his book *The Natural Mind*—there's a flaw in postulate three. How is the germ presented to the animal? By bypassing all of the body's defense systems, since it's injected directly into the bloodstream!

The naturopath claims that disease resistance is the *main* story! It *allows* germs to become a factor.

PLOWBOY: Are you saying, then, that someone who leads a healthful life would be less likely to contract a contagious disease?

SAUL: Absolutely. They'd be less likely to catch it, and if they *did*, it would be less severe. Here's a simple example. Our children had been playing with the neighbor's kids just before those children's chicken pox became visible, at the most contagious stage of that disease. A few days later, the other kids had chicken pox. But our youngsters developed only five or six spots apiece. We upped their vitamin C and that was the end of that.

PLOWBOY: That sounds analogous to the increased disease and bug-attack resistance shown by healthy, organically grown plants.

SAUL: Certainly. And you can apply that same line of comparison when considering the laboratory animals used in medical research. Think about the white rats—generation after generation after generation of them—that are fed only commercial rat food. That diet can't possibly contain *every* natural factor . . . it can only contain what we humans think rats need for a healthy life. OK?

So all of these rats get the same diet . . . one that quite possibly is deficient, and certainly is given in excess. We introduce germs to these animals and they drop dead. When I was in Australia, I studied with Professor S.A. Barnett of the Australian National University in Canberra. He asserted that if those same experiments were conducted with London sewer rats, the results would be quite different, because those rodents wouldn't be so quick to die. Not only do London sewer rats have a more broadly based diet . . . they're also, of course, constantly exposed to germs. There simply wouldn't *be* any rodents if the population wasn't able to resist illness. Again, resistance is the question . . . not germs.

And people can *build* resistance by getting plenty of rest . . . plenty of exercise . . . and the right kind of diet. We also need vitamin supplements, especially vitamin C. If folks follow these simple rules, though, germs will really become more or less irrelevant. This sort of natural disease prevention is always to be preferred to medical inoculation and such. If it's a toss-up, go with nature. Nature has had thousands of years to work out the enzyme/vitamin/elimination/nutrition structures of the body. Nature has had a *lot* of experience.

The medical establishment, for all its good intentions, has had considerably less experience.

You know, when the signers of the Declaration of Independence were sitting down at the table, one of the gentlemen present was Dr. Benjamin Rush, surgeon general of the Continental army. When they sat down to sign the Declaration—to more or less create this country—Dr. Rush said the following: "The Constitution of this republic should make special provision for medical freedom, as well as religious freedom. To restrict the art of healing to one class of men, and to deny equal privileges to others, will constitute the bastille of medical science. All such laws are un-American and despotic."

And this, of course, is the real crux. Medicine is not a science . . . it's an art. And that's why people should be *encouraged* to be their own doctors . . . because it's an art form, for which you need no degree, and which generally requires no training that you can't pick up on your own.

Just remember this basic point: Our *internal* environment is the primary influence on our health! We're talking about inner-space ecology. We're talking about interior homesteading. And the rewards of naturopathic living can be enormous. To sit down to a simple, healthful meal with healthy children and to be able to know that your basic bodily equipment is functioning as well as possible, should, I think, be a more important aspect of self-reliance than solar heating!

PLOWBOY: One of the first rules of a self-reliant lifestyle is that you must take care of your tools . . . and you're talking about the most precious tool we have.

SAUL: Exactly. This body is the only one we're going to get, so we owe it to ourselves to be careful with it. And I think that we can get better health care by doing the job ourselves than we can by contracting it out.

Of course, if you are going to doctor yourself, it's vitally important that you take the time, do the reading, and put enough energy into it to do a good job. I don't want people going out half-baked . . . reading one book and thinking they're experts.

But make no mistake, naturopathic remedies *do* work. If a dedicated person goes into the field to prove nature cure wrong, he or she will wind up proving it right. The truth will stand on its own. The folks with *real* problems are those who can't be bothered to look into natural healing at all. The people who are indifferent. The people who don't care.

Our hospitals and nursing homes are filled to *capacity* with those people!

EDITOR'S NOTE: People interested in obtaining more information about Dr. Saul and the Ashwins Health Institute can [1] mail a self-addressed, stamped envelope—along with a dollar or two to cover expenses—to the Ashwins Health Institute, Dept. TMEN, 23 Greenridge Crescent, P.O. Box 144, Hamlin, New York 14464 for general information . . . [2] send a tax-deductible donation of $10 or more to receive a copy of Doctor Yourself *by return mail . . . or [3] send a donation of $20 or more to receive* Doctor Yourself, *"Techniques for Successful Fasting", and a packet of related home health-care information.*

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ECONOMIC OUTLOOK

A LOOK BACK AT AMERICA ...FROM THE YEAR 2005!

Ever since its inception, this magazine has preached the importance of our preserving the unique planet on which we live and has stressed the inevitably dire results of failing to do so. This month, rather than going into the short-term economic consequences of our "over-consumption folly", we're going to look at the topic from another perspective . . . namely, one that looks back on our current situation with the 20/20 hindsight of a person living in the next century!

The following excerpted address, given by Colorado's Governor Richard D. Lamm at the National Audubon convention last summer, pretends to actually have been delivered by "Secretary of the Interior" Lamm to the 100th anniversary celebration of that same conservation group in the year 2005. "Secretary" Lamm uses this future-view device in a tongue-in-cheek manner, but we think you'll find some real food for thought in the possibilities he presents. They serve as a further reminder of how important it is that all of us —individuals and nations alike—constantly cherish our connection with the earth and use resources that we can provide for ourselves on a sustainable basis. For this type of economic strength is truly the only secure one . . . for us and for our planet.

I appreciate your invitation to address your convention and, as Secretary of the Interior, I am honored to be here in this momentous year to celebrate the 100th anniversary of the incorporation of the Audubon Society.

The President has sent me here to defend the record of this administration. We do not appreciate the strident and coercive criticism we are receiving from conservation groups in general or from this group specifically. The President is doing the best she can, and has asked me to come and respond to your criticisms. I sincerely believe this President is a dedicated environmentalist, unlike some predecessors in the Oval Office. Unfortunately, she does not have the choices that were available in the late 20th century. We do not believe you understand all the pressure on this administration as we enter the 21st century. We do not have the options they had back in the 1970s, the 1980s, or even the 1990s. We live in a world that is crowded, hungry, and in conflict. These matters demand your total attention.

Let me start by saying that I really do sympathize with your viewpoints, but you must try to understand some of the problems we have running a country of 430 million people, and dealing with a world that has over 6 billion people.

You and others have objected to the President's statement that "birds don't vote," comparing it to former President Reagan's statement that "if you've seen one redwood, you've seen them all." That is a tragically mistaken analogy. The President was acknowledging a political reality, not expressing a philosophical preference. Truly, birds don't vote—and in an overcrowded, chaotic world, if you don't vote or have a sponsor who votes, your political agendas are meaningless. . . . politics today is the science of accommodating people, not peregrines; of humans, not hummingbirds. . . .

You all know of the many problems incurred in just trying to feed America, the breadbasket of the world. But perhaps you don't realize the current global farmland crisis. The vast areas of prime farmland we once knew are now history. Over 25 percent of the farmlands of 1980 are now devoid of the topsoil essential for high-yield production, and we have lost 5 billion acres to desertification. In addition, the inexpert use of irrigation in the eighties and nineties created salinity problems we still are unable to solve. Of course, most farmland loss was incurred by simply trying to house our exploding population. We as a planet wasted the one-time inheritance of a foot of the best topsoil that God ever gave anyone.

Since 1980 we have added a population equivalent to 20 Bangladeshes to an already hungry world. We add 2.5 people every second to a world already beyond its carrying capacity. Eighty-eight percent of this growth occurred in the Third World. When you sit down to dinner tonight, there will be 50,000 more people to feed than when you got up from breakfast. We cannot worry about quality of life when we are worrying about quantity of existence. . . .

Did [this administration] lose the People's Republic of Mexico? I resent the insinuation. I agree we have an Iran on our doorstep, but Mexico was lost long before we came into office. Did you really think a democracy that had corruption as a way of life, vast discrepancies between rich and poor, and a birthrate that doubled the population every 15 years would survive? It wasn't *if* the revolution would take place—it was *when*! [This administration] didn't loan them all that money. We learned in the International Banking Crisis of 1986 that 300 million people in underdeveloped countries will *not* get up and go to work each morning for the Chase Manhattan Bank. The President consistently tried to stop those programs when she was in the Senate. But we suffer the results. . . .

No one has forgotten the campaign of 1992—when the "Forests or Families" debate was carried on. But try to understand that my party neither had nor has anything against national forests—we merely believe that housing for people is more important. We've had to build as many housing units in the last 30 years as in the first 300 years of America's existence—and this required an incredible amount of wood. The President, however, is proposing an amendment to the recently passed Forest Reduction Act. This bill is patterned after the old Wilderness Act that was repealed in 1990—and will exempt 5,000 acres in every state from harvesting. This land will be administered by the Department of Leisure. Your resolution criticizes me for requiring nature enthusiasts to apply for permits to the remaining natural forest areas. . . . I'd like to hear some praise for the fact that we *doubled* the acres of urban parks in the nation by taking down the headstones in cemeteries. We are trying.

Next, let me discuss the most controversial legislation now pending before Congress—the compulsory birth control amendment to the National Health Service Act.

We can no longer tolerate the historic anachronism that the number of children a family has is strictly a private decision carrying no social consequences. The individual miracle of birth has become a collective tragedy. . . .

We think this law is clearly constitutional. If the law says you can have only one wife, it can say you can have only two children. This administration will give you the maximum amount of human freedom we can—but our hands are tied. . . . We must have more restriction. . . .

Speaking of rationing, another dark spot on the horizon is the Water Rationing Act. We were hoping to increase your allotment to two baths every week, but we have not had as much success as we had hoped with our recycling programs. Again, I resent being blamed for this conservation measure. . . . Since the Great World Drought of 1992, brought about by increasing global temperature, and since the substantial contamination of so much of the remaining water, our supply of fresh water has dropped dramatically below the 1990 level while demand has continued to increase. We do what we have to do. . . .

We do not have enough resources . . . for our own needs. Tin and lead are virtually gone from the earth, and at current rates of consumption—even under the National Rationing Act—we only have enough sulfur to last nine more years, copper to last 17 years, magnesium to last 44 years, and iron ore to last 70 years. We have picked the earth bare in order to support our bloated world population. The Ship of State is being dismantled to support the crew. Wilderness, birds, and single-family residences were fine in the 1960s when we had only 200 million people, but today they are a luxury we cannot afford. . . .

The laissez-faire advocates heard, but did not heed, prophets such as Albert Schweitzer, who said, "Man has long lost his ability to foresee and forestall; he will end by destroying the earth." Most unfortunately, the warnings of these people were dismissed as groundless doom and gloom. . . . We didn't listen, and my hell—as Secretary of the Interior—is seeing the truth too late. Don't blame the President—blame our collective myopia.

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MEMO: *U.S. Income Tax Deductible Monthly Sponsorship*

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For only 52¢ a day (just $16 a month) you can befriend a needy child through Save the Children. Your money, combined with that of other sponsors, can breathe new life into an impoverished village…help hardworking people in their fight for dignity…turn despair into hope for a child who has known only disaster. 52¢ may not buy much where you live. But for the poorest of the poor, where the need is so desperate, it can work miracles.

For your first monthly sponsorship contribution, just fill out and sign the check at the top of this page (yes, as long as you indicate your bank name and account number, it is negotiable). Mail the entire page to Save the Children. Of course, you may use your personal check if you prefer.

TELL US HOW YOU WANT TO HELP BY ANSWERING THESE QUESTIONS.

Your name _____ (please print)

Address _____

City _____ State _____ Zip _____

1 What kind of child would you like to sponsor?

☐ Boy ☐ Girl ☐ Either

2 What geographical area are you interested in?

Urgent need exists in all the areas listed below. Select an area, or let us assign a child where the need is greatest.

☐ **Where the need is greatest**

☐ Africa
☐ American Indian
☐ Appalachia (U.S.)
☐ Bangladesh
☐ Chicano (U.S.)
☐ Colombia
☐ Dominican Republic
*☐ El Salvador
☐ Honduras
☐ Indonesia
☐ Inner Cities (U.S.)
☐ Israel
☐ Lebanon
☐ Mexico
☐ Nepal
☐ Philippines
☐ Southern States (U.S.)
☐ Sri Lanka (Ceylon)

*LIFELINE Sponsorship – $14 monthly

3 Would you like a picture of your sponsored child?

Shortly after we select a child for you, we can send you a photograph and brief personal history, if you desire.

☐ Yes ☐ No

4 Would you like to correspond with your sponsored child?

If desired, correspondence can help build a meaningful one-to-one relationship. Translations, where necessary, are supplied by Save the Children.

☐ Yes ☐ No

5 Would you like information about the child's community?

Because 50 years of experience has taught us that direct handouts are the least effective way of helping children, your sponsorship contributions are not distributed in this way. Instead they are used to help children in the most effective way possible—by helping the entire community with projects and services, such as health care, education, food production and nutrition. Several times a year you can receive detailed reports on these community activities which provide permanent improvements to the child's environment. Would you like to receive such information?

☐ Yes ☐ No

6 Do you wish verification of Save the Children credentials?

Save the Children is indeed proud of the handling of its funds. Based on last year's audit, an exceptionally large percentage (82.1%) of each dollar spent was used for program services and direct aid to children and their communities. Due to volunteered labor and materials, your donation provides your sponsored child with benefits worth many times your total gift. Would you like to receive an informative Annual Report (including a summary financial statement)?

☐ Yes ☐ No

(A complete audit statement is available upon request.)

7 Would you rather make a contribution than become a sponsor at this time?

☐ Yes, enclosed is my contribution of $ _____.

☐ Check here for general information about our unique programs for aiding impoverished children.

Mail to:

Save the Children®

50 Wilton Road, Westport, Connecticut 06880

Attn: David L. Guyer, President

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ME 1/4

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Established 1932. The original child sponsorship agency. Member of American and International Councils of Voluntary Agencies.

ASK OUR EXPERTS

As most folks are well aware, an attempt to achieve a more self-reliant lifestyle often involves a good bit of problem solving . . . and much of the time, there just doesn't seem to be a ready supply of answers to the questions that come up. We're pleased to present, then, the following column . . . in which a number of well-known individuals from various areas of expertise (such as gardening, alternative building methods, hydroponics, water toxicity, and wood heating, to name a few) have agreed to act as "consultants" for you.

If a question concerning some aspect of self-reliant living has you stumped, send it to Ask Our Experts, THE MOTHER EARTH NEWS®, 105 Stoney Mountain Road, Hendersonville, North Carolina 28791. Please don't expect personal replies, though. The most frequently asked questions will be answered here—and here only—so that we can all benefit from what these folks have to say.

. For the past three Wisconsin winters we have tried—without much success—to keep an active compost pile. We've followed all the standard instructions: We place a thick layer of coarse material (cornstalks and the like) on roughed-up earth . . . put a couple of inches of cow manure over that . . . pile the kitchen garbage on the animal waste . . . and finish the whole thing off with a thin cover of soil and a sprinkling of water.

The three- to four-foot mound heats up for a week or so, but then gives in to the cold weather and dies. What are we doing wrong? Is it *possible* to keep a compost pile alive during the winter?

I wouldn't say you're necessarily doing anything *wrong*, but you need to distinguish between two different approaches to making compost. A *hot* pile is made up of shredded materials, which are put together all at once and kept warm by turning the mound every four or five days, or whenever the temperature in the pile drops below 100°F. No soil is used in such a mound. Compost from a hot pile is ready to go out to the garden in a few weeks.

It sounds as if what you made is a *layered* pile. This is the type of compost we make. It takes longer, but is less work than a hot pile. As you described, coarse materials are put at the bottom (the humic acids from the materials on top help the rough stalks and such to break down, and the coarse bottom layer allows air to penetrate the pile). Next, kitchen and garden wastes are added (we don't use manure, but many folks do). Each layer is watered as it's put on, and—finally—the mound is covered with soil.

This type of compost pile may heat up once and then cool, but as long as it's *kept moist* the breakdown activity will continue. Our layered compost takes about four months to decompose. We work on a six-month cycle, making compost in the fall to be ready for spring, and again in the spring for use the following fall. We also turn the piles once, about a month before we need to use the compost, to insure a complete breakdown of the materials.

We've found that the best compost is at the center of the pile, while that on the outside tends to become dry and not decompose at all. An insulating layer helps prevent that problem by keeping the outer compost damp. Perhaps your pile is losing too much moisture. Try applying a thicker top layer of soil—about three inches—and enclose the mound in a wooden or cinder-block bin to help insulate it (surrounding the pile with hay bales will do the trick, too). Also, although three feet is the usual minimum size for a compost pile, a five- to six-foot mound is the smallest you should build for successful composting in colder climes.

So make your piles larger, insulate them (and keep the mound moist, if necessary), and if you want them hot, turn them regularly. Otherwise, sit back and let nature do it for you!—*John Jeavons and Robin Leler.*

John Jeavons and Robin Leler are dedicated researchers and minifarmers, and they have written several books based on their ten years of biointensive gardening. Their latest publication, The Seed Finder, *is available for $4.00 postpaid from Jeavons-Leler Press, Dept. TMEN, 5798 Ridgewood Road, Willits, California 95490.*

I have a farm pond plagued with crawdads that undermine the banks, causing them to collapse. The resulting shallow water warms up enough to permit algae to grow and allow cattails to take over.

The county conservation people advised me to pour a mixture of fuel oil and mothballs down the crawdad holes . . . but I felt that action would contaminate the pond (besides, there are *hundreds* of holes!).

Can you suggest a nonpolluting way to eradicate the creatures?

Do you really want to *eradicate* the crayfish (or crawdads), or do you just want to control them? It sounds to me as though your problem isn't *crayfish*, but rather *too many* crayfish.

To improve the situation, you'll first need to see whether your water level is stable. Crayfish reproduction is favored by a fluctuating water level (which in itself can undermine pond banks). If there are measures you can take to stabilize the water level, do so. This won't eradicate the crustaceans, but it will reduce the population.

Crayfish, in moderation, are actually an *asset* to a pond. They help control weeds and are an important fish food. Bass, in particular, are fond of the critters. You haven't mentioned what your pond is stocked with, but if it's like most farm ponds, it's probably overstocked with bluegills and understocked with bass. An effort to build up the bass population might help control the crayfish.

Of course, the most straightforward method of "crawdad control" is to catch the crustaceans and eat them. All North American species are edible and, in my opinion, delicious! Crayfish can easily be caught in an ordinary minnow trap that has openings of a suitable size and is baited with meat scraps or a punctured can of dog food. Umbrella nets also work well. If you want to get rid of the crayfish quickly and your pond bottom is free of obstructions, use a weighted seine. Keep in mind, though, that *all* methods of crawdad capture work best at night.

I urge you to view the crayfish as a resource, or at least as a mixed blessing, rather than as a pest. However, if you feel you *must* eradicate them, you are right to fear that the fuel oil-mothballs mixture could contaminate the pond (it's also quite flammable). Other chemical poisons are even worse. An old-fashioned, *nonpolluting* technique involves making up a solution of eight teaspoons of lye to one gallon of water, pouring the mixture into each burrow, and sealing the holes. This method won't contaminate the pond or kill other organisms. *[EDITOR'S NOTE: Bear in mind, though, that lye is a powerful chemical, and take the proper precautions when using it.]*

You *could* eradicate the crayfish with rotenone, but this would also kill the fish . . . perhaps *all* of them (since crayfish are found primarily along the shoreline, the fish in the *middle* of the pond might survive). The standard rotenone dosage to kill *fish* is 1 pound of 5% rotenone, or its equivalent, per 300 feet of shoreline . . . and I imagine it would take a higher dosage to eliminate the crayfish. Mix the rotenone with twice its volume of water and apply it parallel to the bank, just under the water surface. Unlike treatment in the burrows, which requires low water levels, this process is best undertaken when the water is high.—*Bill McLarney.*

Bill McLarney, Ph.D. is a founder of the New Alchemy Institute and its sister organization, NAISA, in Costa Rica. He is the author of three books on aquaculture and numerous technical papers and articles about fisheries and aquatic biology. He currently divides his time among directing NAISA, consulting, and free-lance writing. ❁

"I PAY ONLY 12¢ A BOTTLE FOR GREAT EUROPEAN BEER — WHY NOT YOU?"

Hello. My name is Bud Weckesser, President of Bierhaus International, Inc. in Erie, Pennsylvania.

As you know, the Europeans make great beer. Light lagers, amber pilsners, and superb dark beer.

The only trouble is that they cost an arm and a leg. Develop a taste for a good German beer, for example, and you'll end up paying $15.00 to $20.00 a case. Maybe more.

Now there is a way that you can enjoy great European or American style beer for less . . . much less. In fact, for as little as $2.50 per case.

Let me explain . . .

FISHING IN IRELAND

While I was on a fishing trip in Ireland in 1978 one of my Irish friends offered me a glass of light lager. It was fantastic beer . . . crystal clear with a thick creamy head rising half an inch above the rim of the glass.

After trying several varieties of his pilsner and ale, I was absolutely flabbergasted. I'd never tasted beer this good. It was far superior to any commercial American beer I'd ever tried.

"What kind of beer is this?" I asked.

"It's my own," he replied.

I accompanied him back to his house. There he showed me his 7½ gallon professional Mini-brewery. The brewing formula he used was the same one used by commercial breweries in Germany. Pure barley, imported hops and a special European yeast culture. It was hands down the smoothest beer I'd ever tasted.

I was so impressed that I obtained a few of his special brewing kits to give my friends back home. They enjoyed them so much that they told their friends. And within six months, we were getting calls from people all over the United States wanting to order kits.

Today we offer the same kits throughout the U.S. and Canada . . . and **only** with the following absolute guarantee:

If you don't agree this is the best beer you've ever tasted in your life, I'll buy the kit back.

What's more I'll pay the return postage and, I'll send you an extra $5.00 for your time and trouble. No conditions. No excuses.

MYTHS VS. FACTS

Let me separate some myths from actual facts:

QUESTION — "I remember my Dad used to make "home brew" years ago. It was flat and cloudy."

FACT — Old fashioned "home brew" was lousy. No argument. But we're not talking about old fashioned home brew. The Bierhaus Mini-brewery is TOTALLY different. It contains a professional brewer's fermentation tank . . . the finest hops in the world, imported from Europe . . . 100% PURE barley malt, also from Europe . . . and a superb lager yeast imported from England. The entire brewing process is anerobic . . . just like the best commercial breweries.

QUESTION — Is it easy to make?

FACT — Absolutely. Even a klutz can brew excellent beer in just 27 minutes on a regular kitchen stove. If you want to make 6-8 cases of 12 oz. bottles, it may take 45 minutes. Let it remain in the fermenter for seven days, pour in bottles. Or keg it. You're done.

- No more late night trips to the carry out.
- No more lugging back empty beer cases in the trunk of your car.
- No more chemistry set taste.
- No more standing in line to pay $10.00-$15.00 for a case of beer.

QUESTION — Don't the large commercial breweries with all their expertise produce the best beer in the world?

FACT — That's like saying because cellophane wrapped pie in the supermarket is baked by a national bakery, it has to be better than a homemade apple pie fresh from the oven.

If you use our Mini-brewery and follow the instructions carefully, your beer will be better than commercial beer. We absolutely guarantee it.

One reason is that commercial breweries are allowed to use up to 52 different artifical ingredients . . . tannin, enzymes, plus a host of other chemicals to prevent gushing and to stabilize foam . . . plus three coal tar dyes for artificial color. And they don't even have to list these ingredients on the label.

Our Mini-brewery uses NO ARTIFICIAL INGREDIENTS OF ANY KIND. Absolutely none. As a result, the beer has a fantastic pure taste. You have to TRY IT TO BELIEVE IT.

QUESTION — Can I re-use the kit to make different kinds of beer?

FACT — Yes. You can use your kit over and over again for years. Here are just a few of the beers you can make . . .

LIGHT PILSNER

Very similar to most American premium beers. The light taste of pure barley together with mild hops gives this beer superb body without being filling. A great beer for parties.

BAVARIAN DARK LAGER

This nut brown lager has exceptional taste and heartiness. Excellent with sandwiches or any late night snack. Should be ordered with an extra packet of Hallertauer hops. These traditional German hops are grown in the Munich area and packaged for us in nitrogen sealed pouches.

BRITISH CLUB MILD

Orginally brewed for the private clubs of Northern England, this beer contains fewer calories and carbohydrates than most commercial beers yet has a unique flavor and light amber color that make it popular in many parts of Europe. The ingredients we supply include the original Yorkshire barley malt and English hops necessary to recreate the true British flavor.

ENGLISH PALE ALE

Not to be indulged in lightly, this exquisite pub favorite was orginally brewed in Newcastle, England. It has a distinctive crystal clear copper color and a potency variable from 7%-10% alcohol by volume. You should age it 6-7 weeks before drinking.

DANISH LIGHT

One of the most popular choices for brewing because of its similarity to some of the premium Canadian lagers. The alcoholic content is similar to U.S. beer but, like all of our products, contains absolutely no artificial ingredients or additives. Lightly hopped with a very clean smooth taste. Serve about 40°-44° fahrenheit.

ENGLISH/IRISH STOUT

If you've ever enjoyed a real Stout in a pub, you owe it to yourself to brew several cases for special occasions. We include true dark malt — not the artificially colored kind. These original ingredients let you brew an actual British Stout which you'll be proud to serve your most discerning guest.

DUTCH PILSNER

Very similar to Pilsner Light, but slightly stronger. Dutch Pilsner has a distinct amber color and special vibrant effervescence.

WHERE DO I GET SUPPLIES ONCE I GET THE KIT?

Just call us to reorder ingredients. We stock hundreds of different items . . . malt, hops, and yeast of all kinds. Remember, you can use your Mini-brewery over and over again for years. Federal law allows you to brew up 200 gallons a year. No Federal license is required. No taxes either.

Your new Bierhaus Mini-brewery contains an FDA foodgrade 7½ gallon fermentation tank, air lock, bottle caps, and enough ingredients to make your first test brewing of approximately 2½ cases. The ingredients will be for a standard lager beer so you can compare it to your favorite American commercial beer.

$5.00 FREE

Our guarantee is simple.

Order the kit and make the beer. Serve it to your family and friends and ask them to compare it to their favorite beer. You do the same. If everyone doesn't agree it's better — far better than commercial beer — simply return the kit. I'll pay the return postage. And I'll send you a check for your full purchase price of $39.95. And I'll send you an EXTRA $5.00 for your time and trouble — total $44.95. What's more, I'll send your refund within three working days from the time I receive the returned kit.

If I'm wrong, you just made $5.00.

But, what if I'm right?

FOR EXTRA FAST SERVICE, call us at 814/833-7747 and order your Mini-brewery with MasterCard or VISA. Please call weekdays between 8:30 A.M. and 5:00 P.M. Eastern time.

Or send your check or money order for $39.95 or MasterCard/VISA number and expiration date to: Mini-brewery, Bierhaus International, Inc. Dept. 58, 3721 West 12th Street, Erie, PA 16505. Canadian residents add $6.00. You pay UPS charges upon delivery. Pennsylvania residents please enclose 6% sales tax.

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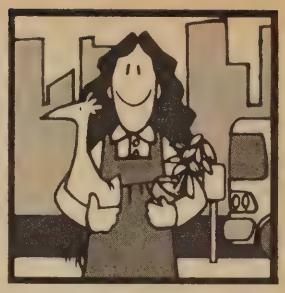
MOTHER'S CHILDREN



HOMEMADE DRAWING CHARCOAL

MOTHER feels strongly that youths can be creative "doers", working toward more ecological and self-reliant lifestyles . . . whether their tasks be raising chickens on a farm or maintaining rooftop container gardens in the city. To support the endeavors of our often overlooked "underage" citizens, we're glad to publish well-written articles from younger children and teenagers concerning projects they've undertaken. However, we recommend that all *young authors query (that is, send us a letter telling about the story you'd like to do) before writing a full article. Address inquiries to Mother's Children, THE MOTHER EARTH NEWS®, 105 Stoney Mountain Road, Hendersonville, North Carolina 28791.*

PHOTOS BY GILBERT J. BERNARDO

TOP: Priscilla packs some wisteria vines (no poison ivy, please!) into a bucket to begin the amazingly simple process of creating drawing charcoal. RIGHT: She then burns them in the sealed container until the smoke stops coming out of the holes in the foil "lid". BOTTOM: As Priscilla's artwork illustrates, homemade charcoal sticks work just as well as store-bought ones!

Priscilla Bernardo

I live in Florida near a small town called Branford. I'm eleven years old, and I moved to Branford when I was six. Since I came here, I have really been interested in art. In fact, it's one of my hobbies.

One day my dad and I were in an art shop. I asked Dad if I could buy some vine charcoal. All he said was, "We'll try making some of our own."

The next day, Dad told me how to make the charcoal, and I set about getting the things I needed. You know what? It was easy to do, and the homemade drawing sticks work just as well as the store-bought kind!

You can make vine charcoal, too. All you need is a long pole, a bucket, a nail, pruners, matches, firewood, and some aluminum foil.

First, you have to take your pruners and cut many pieces of vine. (Wisteria vines are best, but grapevines will do.) Pack them upright into your bucket until your bucket is full. Make sure that no vines are sticking over the rim of the bucket, because the next step is to put two sheets of aluminum foil tightly over the top of the bucket. Then take the nail and put three or four holes in the foil. (Don't put too many holes in the foil, or too much air will get inside.)

When you've done all that, take some firewood and the matches and make a fire. Be sure to have an adult supervise you when you do this part. When the fire is fairly hot, take your pole and put it under the handle of the bucket and hold the container over the fire.

Soon, you should see smoke coming out of the holes in the foil. When the smoke has completely stopped coming out of the holes, take the bucket off the fire.

The next step is very important. DO NOT REMOVE THE FOIL until the bucket has completely cooled, because if oxygen reaches the hot charcoal, the charcoal will burn away into ash. You see, charcoal is formed when wood is heated in the absence of air. That's why you have to keep the foil on.

When the bucket has cooled, take off the foil. You should then have a bunch of charcoal sticks that you can draw with.

I hope whoever decides to do this will enjoy making and using charcoal as much as I have. One bucketful of vines will make a batch of drawing sticks big enough to last a long time.

Of course, if you like to draw as much as I do, you will eventually run out of your vine charcoal. But when that happens, you can just gather up your supplies again . . . and make some more! ●

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We cast some of our tools at the foundry we built, and we'll show you how to do it, too. And we'll teach you how to make your own solar heating system, how to preserve food, how to produce fuel for your vehicles and wood gas for electricity, how to care for bees and raise fish, and how to build a cordwood barn.

Come visit our passive solar, earth-sheltered home and study its design and construction. Spend some time at our new homestead, an integrated ecosystem that—we hope—will evolve into a self-supporting permaculture, with its own hydroelectric system and food-producing areas.

See how a little stream can produce electricity and how a windplant can produce power.

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THE·MOTHER EARTH·NEWS Eco·Village

Where the future looks better.

While constructing their house, this ingenious couple found a way to expand the living space in their camper and recruited ol' Sol to help heat it . . . all for less than $1,000!

"THERMAL ENVELOPE" TRAILER

PHOTOS SUPPLIED BY THE AUTHOR

Caroline Wareham

Like a lot of folks who set out to build their own homes, my partner and I decided to park a mobile trailer on our property (a remote site in northern New Mexico) and use it for shelter until our permanent abode was completed. The advantages of using such a ready-made dwelling are many ("instant" plumbing, a built-in kitchen, a watertight roof, and the like) . . . but so, unfortunately, are the disadvantages. Not the least of these is a form of domestic claustrophobia with the main symptom best characterized as "If I'm stuck in this box another week, I'll go crazy!"

Some people, in fact, succumb to "trailer twitch" by prematurely moving into their still-under-construction homes or (what's even worse) by taking shortcuts to finish their houses quickly. I'm happy to report, though, that there's a much better solution to the problem . . . one that has allowed us to live in relatively roomy (and inexpensive) comfort while building our home *exactly* as we want it at a *sensible* pace. The secret? An insulated, sun-catching, heat-retaining "solar envelope" built around our trailer!

Actually, the structure is little more than a frame shed that has its south-facing wall glazed with plastic film to admit sunlight. It can't really compare with the much more costly and complex double-envelope solar homes that are designed for permanent residency. This design (the brainchild of architect John P. Friedman of Los Lunas, New Mexico) is intended specifically for low-cost, *temporary* quarters. Consequently, it's ideal for owner-builders in our situation . . . or for hunters or vacationers who simply want a bit more elbowroom (and warmth) while living in their trailers. One of the design's strongest assets, in fact, is that an end can be built to be removable—or even to swing open like a giant double door—so that you can drive or tow your camper out with ease. In our case, however, we knew that the only occasion we'd have to open the wall would be when it came time to return our rented unit to its owners, so we erected a more or less "standard" end panel. Once the camper's gone, we'll simply reattach the partition and use the envelope as a garage, a studio, or a woodworking shop.

CONSTRUCTION

With our 8′ X 24′ trailer parked on level ground and situated so that the long side—the one with a door—faced due south, we dug a rectangular 16′ X 26′ trench, about 9″ deep, around the camper . . . and filled the moat with 3″ of pea gravel. If you live in a cold region where frost heaving is a problem, you might want to dig a deeper trench and use more gravel (or, for a permanent foundation, you could pour a cement footing). On top of the fill we put up four stud walls, with the south-facing partition measuring 8′ high and the northerly one 10′. We framed in areas for windows, too, on the east and west panels . . . and built a small access hatch on the east side near the trailer's hitch, so that we could easily use that otherwise wasted space for storage.

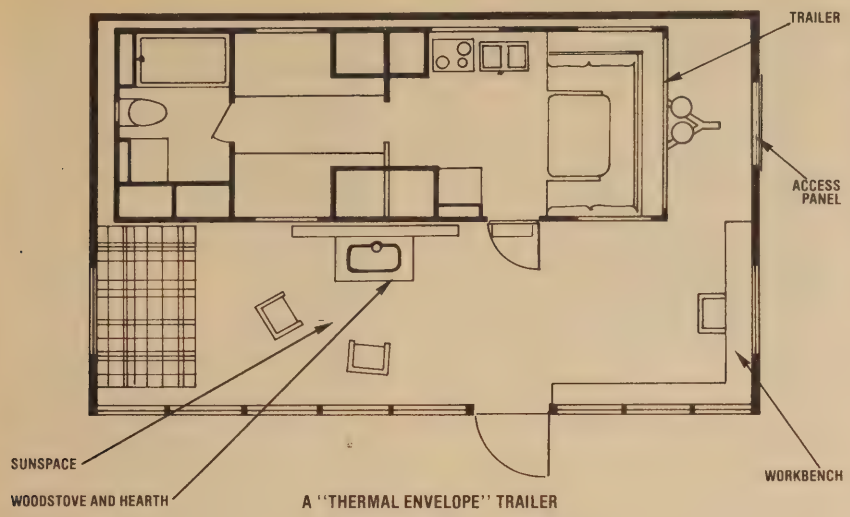
Next, we put up the roof, installing 2 X 6 rafters with a south-to-north pitch of 1 foot for every 8 feet. Then we stapled fiberglass insulation to the east, west, and north walls . . . and nailed tar paper to the outside of the three walls, using furring strips wherever necessary to cover seams and to help anchor the material. Because we didn't intend to install true siding, we also put a board diagonally across each tar-papered wall to serve as a brace.

When we'd done all that, we proceeded to nail corrugated metal roofing to the ceiling beams, insulate the roof, and cover the south wall (minus a full-sized doorway space) with a seamless layer of 6-mil plastic glazing. After that, all we had to do was to tack up glazing over the two windows and install a door. The trailer was then completely enclosed and "in the dry".

AMENITIES

At that point, we'd finished the outside work . . . "elevating" our abode's external appearance from that of a trailer to what looked like a tar-paper shack! The inside of our addition was still bare, though, so we set out to give it the final touches that would make it part of a *home*.

For starters, we installed rough-cut 1 X 10 flooring in the sunspace, attaching the planks to 2 X 4 joists and leaving an open space in the center of the floor for our Franklin woodstove. We lined *that* area with pea gravel, placed the heater on top of the rock, and ran an insulated metal chimney from the fixture through the roof (care-



A "THERMAL ENVELOPE" TRAILER

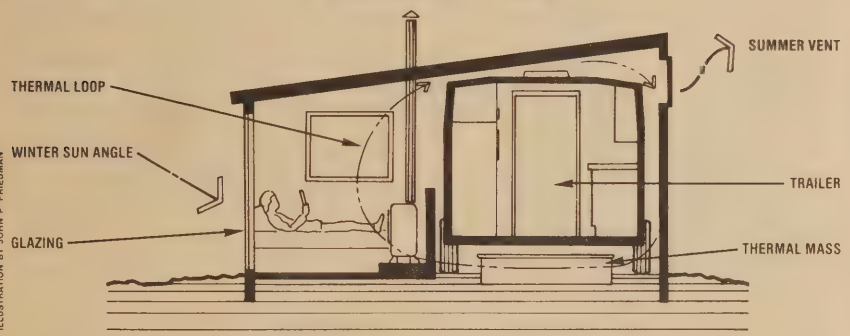


ILLUSTRATION BY JOHN P. FRIEDMAN

fully following the flue manufacturer's instructions for safe installation).

Then we built a bed platform—just a bit wider than the double mattress we put on it—against the west wall, and tacked some paneling over the studs at the head of the bed to give us enough "real" wall for hanging pictures and the like (eventually, we may panel all the partitions). Finally, we added a chair and workbench, some throw rugs, a hanging planter, and a few other items . . . and stood back to admire our cozy new living room.

HEAT, HOT WATER, AND ELECTRICITY, TOO!

Our envelope trailer home is exceptionally easy to keep warm. The living space and the camper soak up Btu from the sun, and additional thermal mass (a water-filled metal stock tank set beneath the trailer plus concrete adobe blocks stacked between the woodstove and the camper) stores the heat gained. Consequently, we stay comfortable throughout the cold winter nights with only an occasional boost from our heater . . . while our neighbors burn cord after cord of firewood.

Ventilation is excellent: Warm air from the south wall and the woodstove rises over the trailer, and the cooled air flows back underneath to be heated again. In the summer, we open two vents cut into the top of the north wall to keep the sunspace from becoming overly hot, and the windows on the east and west provide cross breezes.

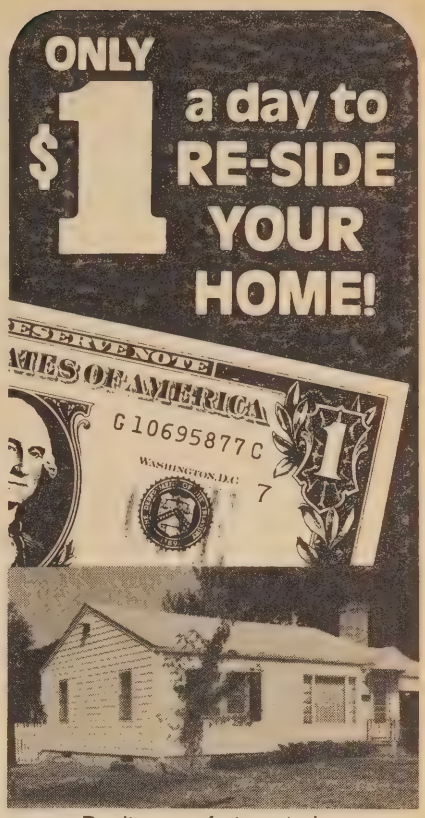
We pump water into our trailer's 20-gallon tank from a nearby spring, and also store an emergency supply of it in containers under the vehicle. We have plenty of *hot* water, too, since the trailer's equipped with a propane heater. In fact, once the liquid inside the tank is up to temperature, it *stays* warm (thanks mostly to the envelope) for several days, with just the pilot burning.

Moreover, since we're two miles from the nearest power line—and getting hooked up to it would cost us a staggering $6,000!—we've installed four photovoltaic panels on the roof. The units provide approximately 800 watt-hours of 12-volt DC electricity each day the sun shines, and we store the energy in two 6-volt golf-cart batteries. The system gives us enough juice for lights in the trailer and sunspace when they're needed . . . and provides current to run our water pump at night, as well as in the day.

IT'S NO MANSION, BUT . . .

I can't say that we're living in the lap of luxury here in our little solar home, but it sure beats the usual cold-in-the-winter, cramped-the-year-round trailer life! Altogether, our heat-grabbing envelope cost somewhere between $600 and $800 (not including, of course, the photovoltaic setup) . . . and we always have the option of dismantling the structure to use the materials for some other project.

Meanwhile, we can spend our time building our permanent house *correctly*. And, instead of being constantly boxed up against the elements, we're enjoying the natural beauty around us.



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This enterprising nurse/mother traded her hectic hospital job for . . .

A HOME NURSING BUSINESS

Faith Williams

When my husband took on the commitment of building our house, I had to abandon full-time mothering and bring home the paycheck . . . by returning to my prior work as a registered nurse. At first I thought I'd enjoy the old camaraderie and excitement of the hospital routine. But I soon found out that—the second time around—all the activity was more of a hassle than a stimulant. Worse yet, I could never stop worrying about what might be happening to my three-year-old son back at home.

Before long, I decided I was going to have to figure out a way to earn money and be *at home* myself! I didn't want to give up caring for people (the one aspect of nursing I'd always enjoyed) . . . and when I thought about it, I realized I didn't have to. After all, there were plenty of senior citizens in our part of Florida who needed—but couldn't always afford—nursing help. So why not care for such an elderly client in my own home?

Once my husband and I had discussed the pros and cons of my brainstorm, he agreed that it seemed like the perfect solution to my problem. So I got our landlady's approval . . . fixed up a room for our prospective boarder . . . and put an ad in the local paper, stating that I was a qualified R.N. looking for a house patient.

READY RESPONSE

I had a specific type of person in mind to care for: a grandfather figure who needed help with dressing, bathing, and other basic care. So when the responses to my ad started coming in, it didn't take me long—after carefully reviewing each applicant's problems and needs—to accept a gentleman in his late 70's with a premature-senility disease. He'd previously been living in an expensive nursing home, but his wife could no longer afford its rates. Consequently, she was so delighted that I was going to caretake her husband that, on top of my $1,200 monthly fee (home-care providers in my area charge from $500 to $1,800 a month, depending on the services provided), she agreed to supply the linen and a hospital bed with side rails!

During his first few months with us, "D" (as I'll refer to our elderly client) improved tremendously. Every day he grew more active and alert. Whereas he couldn't stand without assistance before, he soon was able to roam hither and yon. And with the help of my good home cooking (which sure beat the bland rest-home fare he was used to), he gained ten pounds!

All in all, D's care requires one and a half to two hours a day. This includes bathing, shaving, and dressing . . . taking him for walks . . . and cleaning his room. (I don't count doing D's cooking and laundry in this estimate, since I have to do those chores for my own family anyway.) Of course, someone always has to be home should he need help, so when I have to go to the store or run errands, my husband—who works right next door on our house—checks in on him. And when we all want to get away as a family, I make arrangements for a neighbor to stay with D while we're gone. (I baby-sit her children in exchange.)

One of the most touching aspects of having D with us is the friendship that's been kindled between him and my little boy. My son—who rarely gets a chance to be with his grandparents—enjoys helping me take D on walks. Despite the gap in their ages (or maybe because of it!), the two fellows have developed a special understanding of and warmth for each other. I think each has helped to fill a void in the other's life.

SUPPLEMENTAL INCOME

Four months after I took up home nursing, my landlady approached me with another in-house employment opportunity. A doctor she knew needed help with his billing and wondered if I'd be interested in working for him. (Of course I would!) After I spoke with him, I took the part-time job at $200 a week . . . which included a brand-new typewriter, desk, office supplies, *and* the promise of a $25-per-week raise after six months. This additional money brought my total at-home income up to a comfortable $500 a week!

The new job hasn't compromised the care D receives, either. I just fit the billing work in around his schedule . . . during the evening or any slack time in the day.

So, all things considered, I'm doing pretty well for my family—*and* for myself!—by working at home. Not only can I provide a more-than-adequate income for my household (while being able to monitor my son's activities to my heart's content!), but I even have a bit of free time for leisure activities—such as reading—that I never could manage when I ran the household *after* those grueling eight-hour hospital shifts! ❦

Here's a switch: This senior citizen provides her form of care in other *people's homes!*

RENT-A-GRANDMA!

Irene I. Davis

As I sat down with my morning cup of coffee on the day of my youngest child's twenty-first birthday, I felt unaccountably bereaved. She'd been living in another state for the past two years, I told myself, so why should this day feel grayer than any other? Yet it did.

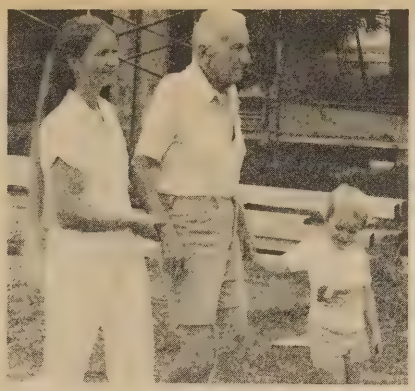
Pensively, I leafed through an old psychology magazine until I came across an article titled "The Empty Nest Syndrome" . . . a piece detailing "the acute depression that sometimes affects parents when their children are grown". Could that be the cause of the malaise I was feeling? Well, if it was, I was determined to stop it dead in its tracks. I'd find a way to be active again and use my teaching aptitude, training, experience, and never-say-die energy to keep my horizons expanding!

It took me a while to figure out just how I was going to do all this, but finally—after listening to my husband grumble something about "car rental dealers"—I came up with a perfect plan to beat the empty-nest syndrome. Since one role in life that I both enjoyed and excelled at was being a "grandmother", I'd simply rent myself out *as a bona fide grandmother to folks who needed a temporary live-in baby-sitter! For a very reasonable fee, I'd go into someone's home and care for the children as if they were my own kissin' kin. I'd rock, cuddle, scold, praise, listen to prayers, and bake cookies. I'd tell stories and play games and let the kids call me "Grandma" so they'd feel comfortable around me. (Why, I might even help clean house!) In short, I'd be an on-the-job, round-the-clock, all-around grandmother to my clients!*

With the help of "Grandpa", I came up with a minimum rental period of one week and a maximum of three, for which I'd charge a daily fee plus *any transportation costs. And I'd be willing to go just about anywhere, as long as someone was willing to get me there.*

STAFF PHOTO

Once all the groundwork was laid for my "rent-a-grandma", I made a few placards and—together with friends—spread them around within a 200-mile radius of my Minnesota home. Well, that was over six years ago . . . and I've been busy ever since! (I've had offers for "grandma-ing" from as far away as Kentucky and California!) My little advertisements have brought me a passel of rewarding experiences and a host of devoted "grandchildren" . . . from ages 8 to 82! And what about those expanding horizons? Rest assured, they continue to widen!



"D's one of the family now. One of the most touching aspects of having him with us has been the friendship that's developed between him and my little boy. Despite (or maybe because of!) the differences in their ages, they've developed a special warmth for each other."

PHOTOS SUPPLIED BY THE AUTHOR

BEFORE YOU NURSE AT HOME

Here are a few questions to consider before you decide to care for an older person in your home:

[1] Do you truly enjoy caring for others?

[2] Are you a homebody, or do you prefer to be out and about most of the time?

[3] Do you really understand the needs of older—and/or very confused—people . . . and are you experienced *at caring for them?*

[4] How well would your family adjust to such a situation?

[5] Would such constant responsibility ultimately be too much to handle or too confining?

[6] Is your current home adequate for such a setup?

*[7] Could you swap baby-sitting for boarder-sitting—or get other "relief help" —so you could have some time for yourself (*and *your family)?*

After giving each of these questions serious consideration, if you still want to take an elderly person into your home, it's time to examine the other *hurdle . . .*

REGULATIONS

While most states don't require that you be a registered nurse in order to care for an older person in your home, many do demand some form of licensing. *Don't panic, though. In most cases, acquiring such "legalization" is neither difficult nor expensive. However, since it may involve a bit of bureaucratic rigmarole, it can be very time-consuming!*

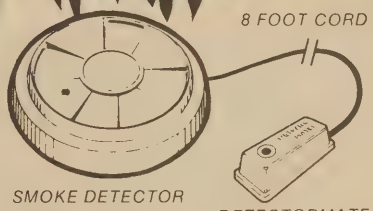
For example, we did some checking in North Carolina and discovered that if you were a Tarheel planning to take in from one to five nonrelated boarders needing special care, you would have to obtain what's known as a Family Care Home License *before you could go into business. The first step on the road to such certification is to visit the Adult Home Specialist at your nearest Department of Social Services office and fill out an application.*

After that's done, agency employees will evaluate your financial stability, health, and so on to determine your ability to care for someone else. Then they'll inspect your home to make sure it's suitable for nursing services. This entire screening process could take up to six months to complete, but—at least in North Carolina—it is provided without charge.

Once you're approved and actually in business, the department will keep tabs on you to make sure you're living up to the requirements stipulated in the licensing agreement. This may sound like a nuisance, but it has its good side: The professionals at the social services office can provide supplementary assistance and/or referrals should your patient ever need them.

The procedure for obtaining a license varies from state to state (in some areas you may not be required to get one at all), so before launching your own in-house "elder care" business, check out your *area's regulations by contacting either your local social services office or health department.*

Smoke Detector Owners:



Are you plagued with nuisance alarms when cooking or when you open your wood stove? How do you deal with this unpleasant problem?

Do not remove the battery!

With **DetectorMate** all you need to do is press a button. **DetectorMate** will silence the alarm and turn on its indicator light for 4-6 minutes.

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Yes! Send me _____ **Detectormate(s)** at $9.95 + $1.30 p&h each. If I'm not fully satisfied, I can return it within 15 days for a full refund including postage.

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SOTZ AIRTIGHT WOODSTOVES

HEAVY STEEL $34.92

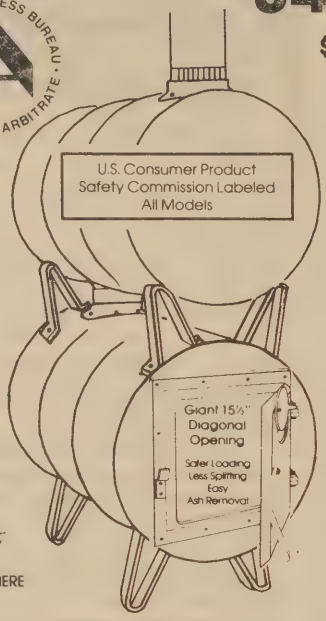
55-Gal. bottom kit factory pick-up

$26.94 30-Gal. bottom kit factory pick-up

Kits convert 15 to 55 gal. drums (not supplied) into high capacity stoves.

BETTER BUSINESS BUREAU · PLEDGED TO ARBITRATE ·

U.S. Consumer Product Safety Commission Labeled All Models



55 GAL. HEAVY STEEL SHOWN HERE

55 Gal. 15½" Diagonal Opening (140 Sq. In.)
15-30 Gal. 9¼" Rd. Door Opening (70 Sq. In.)

SIZE KIT	ORDER MODEL #	FACTORY PICK-UP	DEL.
30 Gal. Bottom	30H	$26.94	$30.94
55 Gal. Bottom	55H	$34.92	$38.93
Top Kit Fits Both	DD	$17.92	$20.93

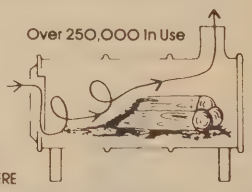
(Drums Not Supplied)

MOST EFFICIENT KITS PATENTED INTERNAL DRAFT CHANNEL

Mounted to inside of door on **heavy steel** kits only

ORIGINAL 15-30 AND 55 GAL. ONLY

AIR ENTERING TOP DRAFT CONTROL IS **PRE-HEATED** AS IT IS DRAWN DOWN INSIDE OF DOOR. AIR IS SUCKED INTO BOTTOM OF HEATER WITH A TURBULENT ACTION, MIXING WITH THE WOOD GASES, MAKING THESE 2 HEAVY STEEL MODELS SPARKPROOF AND TOPS IN EFFICIENCY. LIFE-TIME HEAVY STEEL, TAPERED FORMED, SELF-ADJUSTING DOOR AND FRAME SEAL



HEAVY STEEL SHOWN HERE

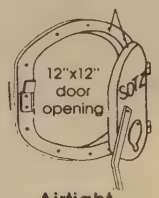
SOTZ CHALLENGE

Use a HEAVY STEEL Sotz 2-Drum Stove Kit (with Internal Draft Channel), a Corning® Combustor and Auto Draft for one year. If you find a more efficient, longer burning, higher capacity Woodstove, we will give you all your money back + shipping both ways. That's how sure we are Sotz is the best! All Kits guaranteed for life against cracking, warping and burn-up.

NEW ECONOMY CAST IRON

Cast Iron

For Those Who Want Cast Iron.



$29.95 FACTORY PICK-UP

Kit fits drums from 30-55 gallon

Airtight Gasketed Door

30-55 Gallon Cast Iron	Order Model #	Factory Pick-up	Del.
Bottom Kit	CI30-55	$29.95	$34.95
Top Kit	DD	$17.92	$20.93

Drums Not Supplied

ALL STEEL & CAST IRON STOVES FEATURE:

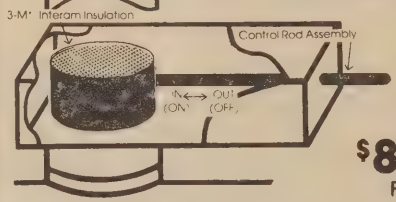
- **Airtight design and draft control engineered to limit the amount of oxygen entering stove for controlled, safe, efficient heat. Prevents over-firing so drums can't burn up.**
- Use of draft control allows you to heat large or small areas. Basement installation heats your entire home. Great for your garage, workshop or cabin. Top drum squeezes 60% more BTU's from heat normally lost up the chimney. Bolts together quick and easy.
- **Legs bolt to drum in 8 places; strong, stable, safe, won't wobble.**
- Top Drum Kit includes heavy duty connector pipe, others don't.
- **10" long safety door handle. Keeps hands away from hot stoves. Adds leverage.**
- Jamb nuts on latch, draft control and hinges for precise adjustment. Won't come loose.
- **Original 2 bolt camlock door catch won't bend or break off.**

ACCESSORIES FOR ALL WOODSTOVES

YOU CAN HEAT MORE EFFICIENTLY

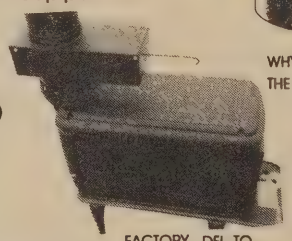
SOTZ CATALYTIC COMBUSTOR KIT

Assembles & Installs in about a ½ hr



Fits woodstoves with 6" and 8" fluepipe

WHY NOT HAVE THE BEST FOR LESS?



$89.95 Factory Pick-up

SOTZ WOODSMOKE BURNER

- Uses Corning® Brand 3" thick catalytic combustor - others use inferior 1½" thick off brands. Check before you buy.
- 6" or 8" Models - Hooks right to pipe or elbow. No expensive adaptors to buy.
- Chemically changes smoke so it reburns. Increase heat output 20%. Reduce creosote 90%. Reduce smoke pollution 75%.

SOTZ COMBUSTOR KIT	FACTORY PICK-UP	DEL. TO YOUR DOOR
1CCC-FITS 6" FLUEPIPE	$89.95	$95.95
3CCC-FITS 8" FLUEPIPE	$93.95	$99.95
2CCC-FITS SOTZ 2-DRUM	$89.99	$95.95

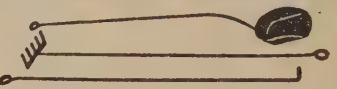
NO RISK GUARANTEE

TRY A CORNING® ON YOUR WOODSTOVE FOR UP TO ONE YEAR AND IF YOU DON'T AGREE IT PAYS FOR ITSELF IN:

- FIREWOOD SAVINGS
- REDUCED CHIMNEY CLEANING BILLS
- LONGER BURNS BETWEEN LOADINGS
- MORE HEAT
- LESS SMOKE
- LESS CHANCE OF CHIMNEY FIRE

YOUR MONEY WILL BE REFUNDED.

SOTZ WOODSTOVE TOOLS



*SOTZ long handle woodstove tools, over 40". Keeps hands away from hot stove. Safe.

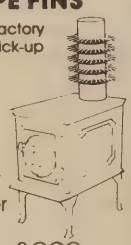
*Special rake uncovers charcoal from ash. Results: Charcoal burns, increasing heat output, efficiency, and length of burn. Decreases ash buildup.

$12.81 FACTORY PICK-UP

WOODSTOVE TOOLS	FACTORY PICK-UP	DEL. TO YOUR DOOR
	$12.81	$15.95

SOTZ STOVEPIPE FINS

5 Fins for **$4.95** Factory Pick-up



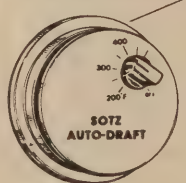
- Recover that heat going up your chimney.
- For wood/coal stoves, furnace, water heaters.
- One size fits all diameter pipes from 3" to 8".
- 5 fins on 8" pipe recovers 2,000 BTU's. Double BTU's by using 10 fins.
- Works great with the combustor.

	FACTORY PICK-UP	DEL. TO YOUR DOOR
STOVE PIPE HEAT FINS (Set of Five)	$4.95	$5.95

SOTZ AUTOMATIC DRAFT CONTROL

$21.95 Factory Pick-up

FITS HERE



FOR AIRTIGHT WOODBURNERS

- Maintain steady, comfortable temperature for hrs., without adjusting.
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AUTO DRAFT FOR	FACTORY PICK-UP	DEL. TO YOUR DOOR
Spin Draft Stoves	$21.95	$23.95
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10% Off Accessories **SOTZ ACCESSORY DISCOUNT OFFER** 10% Off Accessories

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Sotz Inc., 13628 Station Rd., Columbia Station, OH 44028

WELCOME

. . . to our mini-manual of winter craft projects. The following 12 pages contain something for knitters and crocheters of every level of skill, from an easy scarf to a multi-cabled sweater. (There's also an illustrated section explaining the basics of both arts to aid the novice and to help jar the memory of the rusty.)

Of course, there may be a few people who initially won't be enthusiastic about such enterprises. "Why knit?" a noncraftsperson may grumble as he or she watches—fascinated nonetheless—while brilliant-hued Fair Isle sweaters, intricate fisherman's jerseys, or complicated cable pullovers emerge from an experienced knitter's speedily clicking needles. Well, aside from the satisfaction of creating a beautiful garment, knitting offers you the chance to do it *better* for *less*: We figured out from a yarn-sample card that an Icelandic sweater (retailing for $125) could be knitted for about $25 in yarn!

To be sure, that's using your own labor, but what kind of price can you attach to what might otherwise be *wasted* time, anyway? You see, one of the marvelous benefits of knitting is that it can be practiced anywhere and anytime a person has a few spare minutes. Who hasn't envied a needle clicker during a long, boring town meeting, political speech, or other obligatory function? That person's twiddling up something useful while many other folks are twiddling only their thumbs!

Crocheting (the needle-arts cousin of knitting) has delighted advocates, too. Some folks prefer crocheting, because it is faster than knitting . . . and, since it involves using only one needle, it is a bit easier to learn. (Many wise craftspersons learn both arts and then are able to employ whichever one is appropriate for the project they're undertaking.)

So draw a good light close by your favorite easy chair, throw another log on the fire, and lean back and dig into this mini-manual. For the price of a few hours of your time and a few dollars for the basic supplies, you can have a rewarding pastime to enrich the rest of your life. ●

STAFF PHOTOS

A Gallery of Winter

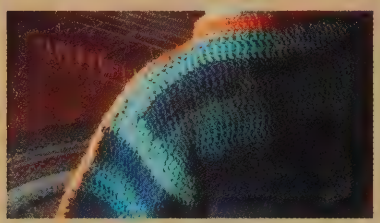
CRAFT PROJECTS

A MOTHER EARTH NEWS MINI-MANUAL

Crocheted slippers (section 5)

The Rainbow Ripple Afghan (section 2)

The Log Cabin Pullover (section 7)

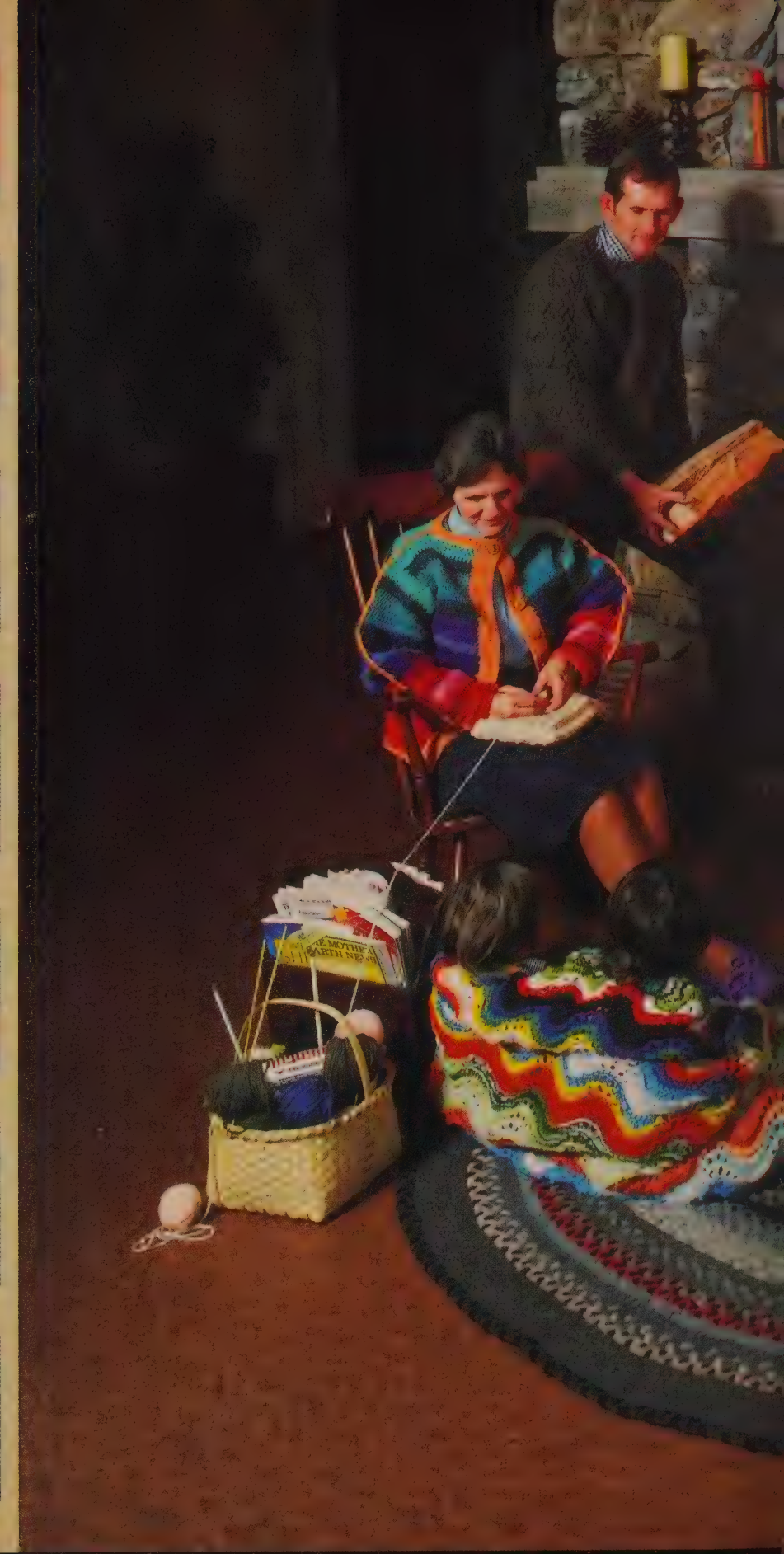


The Rainbow Crocheted Sweater (section 6)

A child's Hand-to-Hand Sweater (section 4)

An adult's Hand-to-Hand Sweater

The garter stitch Hand-to-Hand Sweater



Knitted hats (section 3): the Ganomy . . .

the Maltese . . .

the Triton . . .

the Triton (a different version) . . .

and the Three-Cornered Hat

The "I Knitted It Myself" Scarf (section 1)

A Gallery *of* Winter

CRAFT PROJECTS

A MOTHER EARTH NEWS MINI-MANUAL

HOW TO KNIT AND CROCHET

This material is adapted courtesy of Coats & Clark Inc. from Book No. 170-D *Learn How Book* (copyright © 1975, Coats & Clark Inc., 12th edition—383) and from Book No. 190-B *Learn How to Knit* (copyright © 1968, Coats & Clark Inc., 28th edition—281). Each book can be ordered for $1.00 postpaid from Coats & Clark Inc., P.O. Box 1010, Dept. CEAD-MEN-1/84, Toccoa, Georgia 30577.

Below you'll find directions for both knitting and crocheting, which should get a novice started. However, we strongly recommend supplementary reading, plus —if possible—attendance at a class or two. Many yarn shops offer instruction. Or try your local Y, other community groups, or even a skilled relative or neighbor for lessons. With a little coaching, you can have that first warm, cozy scarf or hat done before you know it.

KNITTING BASICS

CASTING ON

[1] Make a slipknot on the needle, about 2 feet from the end of the yarn (Fig. 1).

[2] Loop the end yarn around your left thumb and hold the needle in your right hand (Fig. 2).

[3] Insert the needle through the underside of the thumb loop (Fig. 3).

[4] With the right hand, wrap the yarn from the ball over the point of the needle from the back (Fig. 4).

[5] Draw it through the loop (Fig. 5).

[6] Gently pull the free end of the yarn with the left hand to tighten the stitch, while slipping the loop off your thumb.

KNITTING

Hold the needle with the required number of cast-on stitches in your left hand and the other needle in your right hand. Insert the right needle into the front of the first stitch on the left needle from the left side (in other words, poke the needle *up* into the stitch), keeping the ball yarn to the back of your work. Now, with the right hand, bring the yarn over the point of the right needle. Draw the yarn through the stitch, and slip the old stitch off the left needle (Fig. 6).

Repeat the sequence as needed. You'll notice as you knit that a new row is being formed on the right needle. Always keep pushing your work up so that the stitch on which you are working is near the tip of the left needle. When an entire row has been knitted, switch the finished work to the left hand and begin the procedure again.

PURLING

The purl stitch has two differences from the knit stitch.

[1] In plain knitting, you keep your yarn at the back of your work. In purling, you bring it to the front.

[2] In plain knitting, you insert your needle in front of the stitch from the left side. In purling, you insert your needle in front of the stitch from the right side (poke *down*). With the right hand, pass the yarn over and under the tip of the right-hand needle (Fig. 7). Draw the yarn through the stitch and slip the old stitch off the left needle.

INCREASING

When you wish to increase the number of stitches in a row, knit first into the front of the stitch to make one stitch but do not slip the old stitch off the left needle. Next, knit into the back of the same stitch to make another stitch (Fig. 8). Now, slip the old stitch off the left needle. You'll find that two stitches will be transferred to the right needle instead of just one.

If you need to increase while purling, purl first in front of the stitch to make one stitch, but do not slip the old stitch off the left needle. Now, purl into the back of the same stitch to make another stitch (Fig. 9). Slip the old stitch off the left needle . . . and you'll see that two stitches have been transferred to the right needle instead of one.

DECREASING

On a knitting row, you can decrease by knitting two stitches together (Fig. 10).

On a purling row, you can decrease by purling two stitches together (Fig. 11).

YARN OVER

If you're knitting, bring the yarn to the front of the work, then over the right-hand needle to the back of the work. With the yarn in this position, insert the right-hand needle in the next stitch on the left-hand needle (Fig. 12) and complete a knit stitch. One extra loop is now on the right-hand needle.

For purling, bring the yarn to the front

HOW TO KNIT

FIG. 1

FIG. 2

FIG. 3

FIG. 5

FIG. 4

FIG. 6

FIG. 7

FIG. 8

FIG. 9

FIG. 10

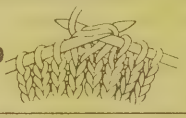


FIG. 11

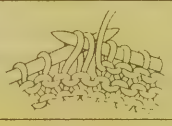


FIG. 12

FIG. 13

of the work, then over the right-hand needle to the back of the work. Again bring the yarn to the front of the work. Now, with the yarn in this position, insert the right-hand needle in the next stitch on the left-hand needle and complete a purl stitch. One extra loop is now on the right-hand needle (Fig. 13).

BINDING OFF

Begin by knitting two stitches loosely. With the left needle, pass the first stitch over the second one and the tip of the right needle, which leaves one stitch on the right needle. Knit the next stitch and repeat the process. Continue until all of the stitches except one have been bound off. Break the yarn and draw the end through the remaining stitch.

KNITTING ABBREVIATIONS

K . . . . . knit
P. . . . . purl
inc. . . . . increase
dec . . . . . decrease
st(s) . . . . . stitch(es)
tog . . . . . together (at the same time)
beg . . . . . beginning
sl. . . . . slip stitch to the right needle without knitting
psso . . . . . pass slipped stitch over following stitch
yo . . . . . yarn over

An asterisk (*) means repeat the instructions following the asterisk as many times as indicated. Sometimes instead of an asterisk you'll see a phrase such as *(K2 tog, K2) 5 times*. This means that whatever is specified in the parentheses should be repeated the number of times indicated after the closed parentheses.

CROCHETING BASICS

THE FOUNDATION CHAIN (OR CHAIN STITCH)

[1] Holding the broad bar of the hook as you would a pencil, make a loop with the yarn, and then catch the yarn with your hook and pull it through the loop to produce a slipknot (Fig. 1).

[2] Lay some yarn from the ball between the fingers of your free hand, with the strand wrapped once around the little finger, then under and over the other fingers as shown (Fig. 2).

[3] To crochet the chain stitch, catch the thread from the left forefinger and draw it through the loop on the hook (Fig. 3). Always bring the thread from behind the hook.

[4] Repeat this process until you have the desired number of stitches (Fig. 4).

SINGLE CROCHET

[1] Count back two chain stitches—do not count the loop on your hook!—and insert the hook into the second chain (Fig. 5).

[2] Catch the ball thread and draw it through the chain (Fig. 6).

[3] You'll now have two loops on the hook. Wrap the ball yarn over the hook

HOW TO CROCHET

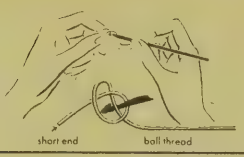
FIG. 1


FIG. 2

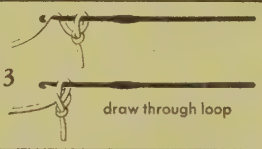
FIG. 3


FIG. 4

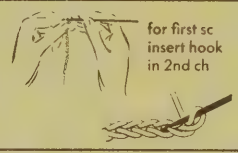
FIG. 5


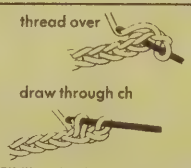
FIG. 6


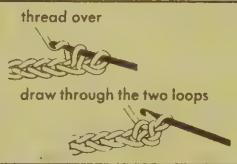
FIG. 7


FIG. 8

FIG. 9

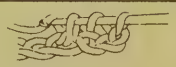
FIG. 10


FIG. 11

FIG. 12

FIG. 13

and draw it through the two loops. You've completed one single crochet (Fig. 7).

[4] Hook the next chain and repeat the process.

HALF DOUBLE CROCHET

The half double crochet is made by wrapping the yarn over the hook and then inserting it into the third chain from the hook. At that point, there will be three loops on the hook. Wrap the thread over and draw it through all three loops at once (Fig. 8).

DOUBLE CROCHET

[1] Wrap the yarn over the hook, then insert it into the fourth chain (Fig. 9).

[2] Wrap the yarn over the hook and pull it through the stitch. There will now be three loops on the hook (Fig. 10).

[3] Wrap the thread over and draw it through two loops, leaving two loops on the hook (Fig. 11).

[4] Wrap the thread over the hook again and draw it through the two remaining loops, so one loop remains on the hook. You've completed one double crochet (Fig. 12).

TREBLE CROCHET

[1] Wrap the thread over the hook twice, then insert the hook in the fifth chain from the hook. Wrap the thread over and draw it through the stitch, leaving four loops on the hook.

[2] Wrap the thread over the hook again (Fig. 13), and draw it through two loops, leaving three loops on the hook.

[3] Wrap the thread over again and draw it through two more loops, leaving two loops on the hook. Wrap the thread over once more and draw it through the two remaining loops, leaving one loop on the hook. You've completed one treble crochet.

OTHER TERMS AND TECHNIQUES

There are several other terms and techniques you'll need to become acquainted with that will crop up in crochet directions. One is the *slip stitch*, in which you insert a hook in a stitch, wrap the yarn over, and then draw the yarn through both the stitch and the loop on the hook with the same motion. The slip stitch differs from single crochet in that you don't wrap the yarn over again before you pull it through the loop on the hook. It's often used to join the ends of a short chain together so you can start on shaped items such as hats, bedroom slippers, or doilies.

Unlike larger articles—afghans, for example—which are usually crocheted in back-and-forth rows, shaped articles are made in *rounds*. The last stitch in a round is joined to the first stitch by means of a slip stitch before the crocheter begins the next round.

If you need to *increase* one stitch, work two stitches in the same stitch of a previous row or work a stitch in the turning

chain at the beginning or end of a row . . . the pattern directions will specify which method to use.

To *decrease* a stitch, work two stitches together by working the first stitch all the way to the final yarn over, but don't yarn over. Instead, begin working the next stitch until its final yarn over. At that point, perform the yarn over and draw the yarn through all of the loops on your hook.

CROCHET ABBREVIATIONS

ch . . . . . chain
sc . . . . . single crochet
hdc . . . . . half double crochet
dc . . . . . double crochet
tr . . . . . treble crochet
sl st . . . . . slip stitch
st(s) . . . . . stitch(es)
rnd . . . . . round
inc . . . . . increase
dec . . . . . decrease
beg . . . . . beginning

An asterisk (*) means repeat the instructions following the asterisk as many times as indicated. Sometimes instead of an asterisk you will see a phrase such as *(ch 2, skip 2 ch, dc in next ch) 4 times*. This means that the directions included in the parentheses should be repeated as many times as specified. ❦

SNUGGLE UP IN A "THANK YOU, I KNITTED IT MYSELF" SCARF

Here's a first-rate beginner's knitting project—designed by Coats & Clark, the yarn manufacturer, and used here with the company's permission—that'll yield a warm 7″ X 70″ scarf. The scarf features the *rib stitch*, which is useful for the novice to learn, since it's frequently employed in knitting.

Materials: You'll need ten ounces of four-ply yarn in a color of your choice (Coats & Clark recommends either its Red Heart Fabulend wool-blend worsted yarn or other Red Heart yarn) plus one pair of No. 10 knitting needles (an easy size to work with for a person who's just learning to knit). For this article of clothing, the gauge is not important.

To start: Measure off about 54″ of yarn and cast on 50 stitches.

Row 1. With the yarn in back of your work, insert the needle from right to left in front of the first stitch and slip it onto the right-hand needle (this is called "slip one st as if to purl"), then K1, *P2, K2. Repeat from * across.

Row 2. With the yarn in front of your work, slip the first stitch as if to purl, then P1, *K2, P2. Repeat from * across. Repeat Rows 1 and 2 alternately until the length is 70″. Bind off in ribbing.

If you'd like to add an eye-grabbing fringe to your scarf, here's how: Cut four strands of yarn, each 16″ long, and fold them in half. Working along one end of the scarf, insert a crochet hook in the center of the first knitted rib and draw the middle of the strands through. Next, draw the ends of the fringe through this newly formed loop and pull them up tightly to form a knot. Do this in each alternate rib across to the opposite corner, and then work the fringe along the other end in the same manner. Finish by trimming the yarn ends to a consistent length.

MOTHER asked a local knitter to try out this pattern. The scarf you see pictured was made from two skeins of Tahki Homespun wool. Because of the weight of this wool, the knitter cast on only 36 stitches . . . if a wider scarf is desired, you can cast on more stitches, but do so in multiples of four. (Our craftsperson noted that the scarf tends to draw together, so it might be a good idea to cast on more stitches than you think you'll really need.)

She made one pattern change, too, which helps to simplify matters for the knitting novice: If you cast on your stitches in a multiple of four, you can follow Row 1 of the above pattern throughout the entire project without having to worry about the instructions for Row 2.

Now that wasn't too bad, was it? Maybe you'd like to learn a little bit more about the craft and tackle one of the following projects! ❦

THE KNIT-IT-FAST RAINBOW RIPPLE AFGHAN

G. Caroline Kuhn

There seems to be a law—probably written by a close relative of Murphy—dictating that needlecrafters will never have just the right amount of yarn for any article they're knitting or crocheting. Invariably, they either buy too much in the first place . . . or decide to stretch what they have on hand, only to find that they have to purchase some more wool and then *wind up* with too much. After a while, most serious needlecrafters build up reserves of these seemingly useless odds and ends . . . half a skein of persimmon, almost a full skein of a peach hue, three-quarters of a skein of an iridescent yarn (left over from a Halloween project?), and some electric ice blue for which a purpose could never be found.

Of course, some bits and pieces can be used as trim for other knitwear projects, but aside from this application, I've found only one way to stem the tide of yarn leftovers: Make an afghan!

My brainstorm occurred last fall as winter was approaching. My daughter sorely needed a new blanket, but I didn't want to buy one (well, I didn't have the money, anyway). What I did have, though, was a 20-gallon garbage bag full of the cast-off yarn from 15 years of knitting. I decided to create a spare-yarn afghan . . . a thermal-type blanket that would be useful year round and that could be made with a minimum investment of time. This latter requirement ruled out time-consuming granny-square comforters. After a little planning, I came up with the following pattern for a Rainbow Ripple Afghan, which knits up rapidly, is attractive, and yields a bed-sized coverlet.

THE KNITTY-GRITTY

Materials: a 24″ circular needle, size 10-1/2 (the gauge is not crucial to this project, as it would be for making an article of clothing), and scrap yarn.

To start: Cast on 204 stitches, and knit in the following pattern:

Row 1. Knit.

Row 2. Purl.

Row 3. K2 tog, three times. *K1, yo, six times, K2 tog six times. Repeat from *, and end K2 tog three times.

Row 4. Knit.

On the first blanket I made, I changed colors at the end of every four rows, leaving the joined ends to give a fringelike effect along the side. If you don't like the way the fringe looks, just work the yarn ends back into the body of the afghan.

Thanks to the large needle I used, I was able to produce the afghan in an amazingly short time. Every evening for two weeks, I sat down and did 12 rows (three bands of color). This yielded a single bed–sized blanket.

Once I'd finished my first knit-it-after-dinner afghan, I started a second one for my son with more yarn leftovers (after all, they'd been accumulating for a long time!). With the experience I'd gained on my first comforter, I became somewhat adventurous on this afghan. I modified the design by making some of the color bands double in size (eight pattern rows instead of four), alternating these ripples

randomly with four-row bands. What's more, I used all types and weights of yarn, twisting two strands of baby-weight or sport yarn together to maintain a uniform weight with the other worsted-weight yarn. (By doubling the yarn I was *really* able to reduce my wool cache.)

In summary, I can't say enough about the virtues of the Knit-it-Fast Rainbow Ripple Afghan. It cost me nothing but some evening hours that I assuredly could have wasted on something far less worthwhile . . . and my versions of it have helped two of my family members ward off winter chill. If you can use a spare blanket around the house (there aren't too many people who can't), dig through your yarn heap and spend a dozen or so evenings cozily knitting by the fire. You'll help chase away the after-Christmas blahs and supplement your blanket chest at the same time!

A HORDE OF HATS

Elizabeth Zimmermann and her daughter Meg Swansen possess enviable reputations in the knitting world as designers (their patterns have appeared in many national magazines) . . . authors of a lively and readable knitting publication called Wool Gathering *. . . and mail-order suppliers of an incredible array of domestic and imported natural-fiber yarns and knitting supplies. Moreover, Elizabeth is the author of three books that form the backbone of many a serious needlecrafter's library:* Knitting Without Tears, Knitter's Almanac, *and* Knitting Workshop *(this last book accompanies Elizabeth's third series of video knitting lessons—also titled* Knitting Workshop*—which appears on PBS channels across the nation).*

Last but not least, Elizabeth and her daughter have undertaken a campaign to revolutionize the way folks approach their knitting. They're firm advocates of circular needles, exciting yarns, and thinking *knitting in which a craftsperson designs and knits a garment without a pattern. (However, the pair is considerate of less adventurous souls—affectionately referred to as "blind followers" as opposed to "wide awake and alert knitters"—and provides careful step-by-step patterns for most of their lovely creations.) We think you'll enjoy Elizabeth's and Meg's spritely and entertaining directions for the hats and sweaters we'll be showing in this mini-manual.*

The headgear detailed below is designed for the intermediate knitter. "Hats are really nice projects," Meg says, "because they take only a skein or so of yarn, require maybe four hours of knitting, and generally turn out OK no matter what transpires, since people will wear practically anything on their heads!"

With the introductions out of the way, let's proceed to a horde of hats.

Meg Swansen

The first three hats are made of Sheepsdown, a soft, light-in-loft, strong, undyed wool. You can use any wool that'll give you the appropriate gauge.

Gauge: 5-1/2 stitches to 2″, with 11 stitches to 4″.

Materials: One skein of Sheepsdown is required for each hat. Use a circular 16″ needle of a size to give you the aforementioned gauge. The largest-sized 16″ needle is a No. 10-1/2 (so relax, you tight knitters). You'll need a set of four needles, the same size, for the top.

Terms: I use standard knitting abbreviations, but one term that I use with which you may not be familiar is M1, which means "make one stitch". You do this by putting a backward loop over the right needle. Another term is SSK (slip, slip, knit), or in other words, slip two stitches knitwise, one at a time, then insert the left-hand needle into the fronts of these two stitches and knit them from this position (or sl 1, K1, psso, if you wish). I slip *all* first stitches at the beginning of a row, or after turning.

THE THREE-CORNERED HAT

This is a form of beret, but it is increased and decreased at three points instead of all around. Its fold is accentuated by two spaced rounds of purl. To begin, cast on a sufficient number of stitches to go around the wearer's head, and work 1″ of border. Increase approximately 50% to a number of stitches divisible by 3, and work around in a stocking stitch. Increase 2 stitches at three evenly spaced points every second round. At 3-1/2″, stop increasing. P1 round, K2 rounds, P1 round. Now, decrease at the same points, at the same speed. After 2-1/2″ of this, decrease *every* round. At 6 stitches, finish off and sew together the beginning garter stitch borders.

Unintelligible esoterica, you say? Very well, let's make it a wee bit easier. . . .

THE BLIND FOLLOWERS' THREE-CORNERED HAT

See the beginning notes on the gauge, materials, and needle size.

Cast on 36 sts. Working back and forth, K5 rows. Next row: K2, M1, across (54 sts). Join, and knit around. Mark 2 sts at three equidistant points with 16 sts in between. Now, *K to 2 marked sts, M1, K2, M1. Repeat from * twice more. K1 round. Repeat these 2 rounds until you have 84 sts. Stop increasing. P1 round. K2 rounds. P1 round. Start decreasing: *K to within 1 st of marked sts, K2 tog, SSK (a decrease of 2 sts). Repeat from * twice more. K1 round. Repeat these two rounds until you have 48 sts. Now, decrease *every* round until you have 6 sts. Finish off, and sew together the beginning garter stitch borders. This pattern will turn out a cute hat whether you wear the point to the front or to the back. Have fun experimenting to find the most attractive angle!

THE MALTESE HAT

This chapeau is based on a fisherman's hat brought back from the island of Malta. It hugs the ears closely and has an antic point, which may be toned down for more subdued persons by faster decreasing at the end. I finished my personal version with a ridiculous tassel of only 14 threads, all uneven in length, with a knot at the end of each one. The hat may be fastened with string or by means of a button and buttonhole under the chin. With the earpieces up, a wearer of this bonnet looks like someone from the Kirgiz. *[EDITOR'S NOTE: To save you a trip to the dictionary, the Kirgiz is an area in south-central Asia formerly inhabited by Mongols.]*

The shaping of this topper is somewhat involved, and so we'll just skip the "thinking" version this time and pass straight to . . .

THE BLIND FOLLOWERS' MALTESE (OR KIRGIZ) HAT

For the gauge, materials, and needle size, see the instructions in the beginning notes.

First, cast on 36 sts. K back and forth for 10 rows. Now, K17, turn, K back. K15, turn, K back. K13, turn, K back. K11, turn, K back. K9, turn, K back. K7, turn, K back. Then K8, turn, K back. K10, turn, K back. K12, turn, K back. K14, turn, K back. K16, turn, K back. K to end of row. Repeat the foregoing instructions on the other side. This completes the shaping of the ear sections.

K1 complete row. For the next row, K15 (M1, K1) 6 times, K15, cast on 14 for the front. Join. There should be 56 sts. Work around 10 rounds (more for a deeper hat), keeping the 14 front sts in a garter stitch for 2 ridges by purling them on the first and third rounds.

To shape the top, decrease 4 sts evenly spaced around (K2 tog, or even P2 tog, K12) four times. K1 round. Repeat these 2 rounds until 8 sts remain and finish off. How you place the decreasing is up to you . . . they can veer to the right or to the left. There will be a stitch less between the decreases every second round.

THE TRITON HAT

Not only is this hat a mysterious *tour de force* . . . but it also turns inside out a fair treat! The Triton is also known as the Conch, the Mashed Potato, the Snail, and the Dairy Queen because of the way in which it spirals together. Again, I'll give just one set of directions.

THE THINKING AND UNTHINKING KNITTERS' TRITON (OR CONCH) HAT

Use the same gauge, materials, and needle size as for the two previous hats.

Cast on 40 sts. K back and forth for 5 rows. Increase 50% to 60 sts by working K2, M1 across. Join. *P2, P2 tog, K16, M1. Repeat from * around for 18 rounds. (Really, these instructions are correct. Ask no questions . . . trust me. *Of course* the thing on your needle is twisting . . . it's a conch, isn't it?)

Now (P1, P2 tog twice, K15, M1) three times. Then (P1, P2 tog twice, K14, M1) three times. Then (P1, P2 tog twice, K13, M1) three times, and so on. Each round will contain 3 sts fewer than the previous one. Continue in this manner to the bitter end, which will consist of 15 sts slipping around on three needles. Hang on to that M1, and for the last round (P2 tog twice, K1, M1) three times. 12 sts remain. Finish them off, and sew together the beginning garter stitch borders.

All three of these hats wash and wear excellently if made of Sheepsdown. In fact, after the newness has worn off, I've been known to toss them in the washing machine.

THE GANOMY HAT

This hat is really an endearing object. The bobble point can flop forward or backward as you wish. In the longer version it has a fine sideways flop. This bonnet hugs the ears better than the more typical skiers' hats. In the interest of saving space, here solely is . . .

THE BLIND FOLLOWERS' GANOMY HAT

Gauge: 5 stitches to 1″.

Materials: You'll need three ounces of Fisherman wool and a No. 4 needle 16″ long (plus four double-ended needles of the same size), or the size necessary to give you the appropriate gauge.

Start by casting on 100 sts and work back and forth in the garter stitch for six ridges. Join, and continue around in a stocking stitch. Mark 3 sts for the center back and M1 on each side of them by backward loops. Then K16 to the left ear, K2 tog, K1, SSK (or sl 1, K1, psso). K26 to the center front, M1, K3, M1. K26 to the right ear, K2 tog, K1, SSK. K16 to the center back. Knit 1 round. Repeat these two rounds until the piece measures 5″ along the shaping lines. Stop the center front increasing and continue the three other shapings until the piece measures 9″ along the shaping lines. You can put in a stripe or stripes in contrasting colors, as you desire.

At 9″, stop the center back increasing but continue the decreasings and work until 16 sts remain. For the topknot, work straight for 10 rounds (by now you're using the four needles, of course). Break the wool, thread it through all the stitches, pull it tight, and fasten the yarn off.

To make a tassel, roll a rabble of wool ends into a ball about 1-1/2″ in diameter, stuff it into the top of the hat, and tie a thread firmly below the pom-pom. Last, sew together the ends of the border at the neck back to finish your topper.

EDITOR'S NOTE: You may order Knitting Without Tears *(paperback, $9.95),* Knitter's Almanac *(paperback, $2.75), and* Knitting Workshop *(paperback, $10.00)—all written by Elizabeth Zimmermann—from Meg Swansen, Dept. TMEN, 6899 Cary Bluff, Pittsville, Wisconsin 54466 (add $1.00 for postage for the first book and 25¢ for each additional volume). You can obtain their book list, which contains many knitting sources (including foreign titles), by sending a long, self-addressed, stamped envelope to the address given above.*

Furthermore, you can get one of Elizabeth's and Meg's wonderfully colored yarn-sample cards by sending $1.00 to the aforementioned address. Also available are subscriptions to the publication Wool Gathering *($7.50 for six issues), which appears every March and September.*

THE HAND-TO-HAND SWEATER (with Aran patterns on the sleeves and shoulders)

Elizabeth Zimmermann

The Hand-to-Hand Sweater featured here has sleeves and a yoke that are knitted in one long piece. It's a version of a garment I designed many years ago, and I've added a few improvements since then. Furthermore, I've simplified the pattern to include a garter stitch version, and I'm not sure now which model is my favorite. I've included both patterns in these directions, so if you hurry and knit both models before spring comes, you can make up your own mind as to which you prefer.

GETTING STARTED

Gauge: 4 stitches to 1″ (and 16 stitches to 4″), measured over the stocking stitch.

Sizes: 38″ (40″, 42″) chest. Don't measure yourself . . . measure a sweater that fits!

Materials: 8 (8, 9) four-ounce skeins of three-ply Sheepswool or 6 (7, 8) four-ounce skeins of Highland wool. *[EDITOR'S NOTE: These are the names of yarns sold by Elizabeth's daughter Meg Swansen—see "A Horde of Hats" on page 44—but any yarn that will yield the correct gauge can be substituted.]* Use one 24″ needle of a size to give the right gauge (roughly a No. 7 to a No. 10-1/2).

Key number of body stitches: 152 (160, 168), measured over the stocking stitch.

BEGIN KNITTING

Starting at the right-hand cuff, cast on 46 (48, 50) stitches, which is 25% of the body stitches plus 7, since the cables "take up". Work back and forth on the circular needle, or you may use straight needles if you wish. *Slip all first stitches.*

Establish the cables: A four-strand cable is in the middle of the work, flanked by double-O cables, or "Mr. Magoo cables", as I call them. These will be divided by P1, K1 back, P1, and will take up 44 stitches. The end stitches are worked in reverse stocking stitch: purled on the right side and knitted on the inside. They will be increased by 1 stitch each side of the cables every fourth row. When you have half of your key number of body stitches —or 76 (80, 84) stitches—work straight to the neck opening, which should be about 24″ (25″, 26″). Now, it's time to describe the cables.

Double-O cable: This cable is 13 stitches wide and 24 rows high.

Row 1. (Wrong side) *P6, K1, P6.

Row 2. Take 3 sts on a spare needle and hold it in back, K3, K3 from spare needle (left over right cable), P1, take 3 sts on spare needle and hold in front, K3, K3 from spare needle (right over left cable).

Rows 3–13. Knit the K stitches and purl the P stitches.

Row 14. R over L cable. P1. L over R cable.

Rows 15–24. Knit the K stitches and purl the P stitches. Repeat from *.

Four-strand cable: This cable is 12 stitches wide and 8 rows high.

Row 1. (Wrong side) *P12.

Row 2. R over L cable twice.

Rows 3–5. P12 on wrong side. K12 on right side.

Row 6. K3, L over R cable, K3.

Rows 7 and 8. P12 on wrong side. K12 on right side. Repeat from *.

These cables may seem complicated at first, but you'll soon get the hang of them, and you'll find they go together nicely. The cabling comes on the same row, so that you'll have three rows of peace in between. Don't forget to separate the three cables by P1, K1 back, P1. *And don't forget the increasing:* It's 1 stitch at each side of the cables every fourth row (on the cable row if you like) until there are 76 (80, 84) stitches, which should be about 15″ (16″, 17″), or the length you want to the underarm.

THE MIDDLE PART

Now, you can introduce a different pattern across the chest on the 32 (36, 40) stitches you have increased, which will be 16 (18, 20) on either side. I used a fractured lattice pattern, which is beautiful but slightly tricky to keep track of. If you like, you can substitute a simpler pattern (some first-rate designs originate this way!).

The fractured lattice: This pattern is 8 stitches wide and 8 rows high. (Note: The sleeves and yoke are made back and forth . . . the body is constructed on a circular needle.)

Left twist (LT): Hold first stitch in front, K second st, K first st.

Right twist (RT): K2 tog, but do not take off the needle, K second st again, take both sts off needle.

Row 1 and all wrong-side rows. P all stitches.

Row 2. *LT, K2, LT, RT, K2. Repeat from *.

Row 4. K1, *LT, K2, RT, K2. Repeat from *, ending K1.

Row 6. *RT, LT, RT, K2. Repeat from *.

Row 8. K3, *LT, K2, RT, K2. Repeat from *, ending LT, K3.

You now have three patterns going simultaneously. Continue without shaping, until the piece is long enough to reach to the beginning of the neck opening, or about 24″ (25″, 26″). The neck width will be about 9″, or—very roughly—half the width of the body. In order to give it superior shaping, make the yoke back longer than the yoke front by including the center four-strand cable with the back. Leave, therefore, the front 31 (33, 35) stitches on a piece of wool and continue on the back 45 (47, 49) stitches. (Note to "blind followers": Yes, you will be shy the K1 back stitch on either front or back. Just increase an extra stitch on the back edge to make a *point lisiere*—that's French for edge stitch—for a neat back edge.)

When you have worked about 9″, try the piece on, in the interest of centering the double-O cable if possible. Break the wool, and with it continue the yoke front to match. Join both pieces, and continue down the left sleeve, not forgetting the decreases when the time comes. When both sleeves match, cast off in pattern.

THE PLAIN PART

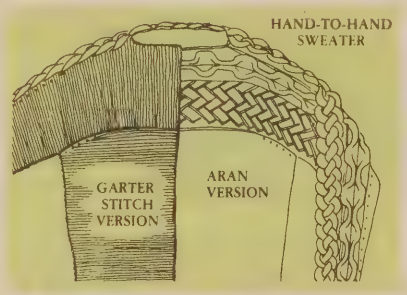
Now comes the plain part. Measure off 19″ (20″, 21″) at the center front, and knit, with the right side toward you, 76 (80, 84) stitches along this piece. I like to do this by knitting up 1 stitch in each of 3 yoke stitches, and 2 stitches in the fourth yoke stitch, and so on. This method rectifies the imbalance between the stitch count and the row count in the stocking stitch. (If you have not been slipping all first stitches, you are on your own.) Join, and work around.

A piece of shaping to do away with bulky underarms: On the front, knit to within 10 (12, 14) stitches of the underarm, and turn. Purl to within 10 (12, 14) stitches of the underarm, then turn. Knit to within 8 (10, 12) stitches of the underarm, and turn. Purl to within 8 (10, 12) stitches of the underarm, and turn. Continue in this manner, with 2 more stitches on each row, until you reach the underarm. Repeat this process on the back.

Now, you can work around to the wanted length, or 17″ (18″, 19″). Put in 3 sets of short rows across the back if you wish. At 15″ (16″, 17″), you may decrease about 10 stitches, evenly spaced across the back only, for a superb fit. Purl 1 round to turn the hem and work 2–3″ in thinner wool, and on fewer stitches if you like. Sew down gently without casting off. Sew the sleeve seams . . . if you have been able to resist this so far. Steam the garment lightly, and try the beautiful thing on.

THE GARTER STITCH MODEL

This version is childishly simple. Follow the same directions, using only the center four-strand cable in all knit. You will find the knitting of stitches for the back and front are much simpler . . . just 1 stitch for each ridge. The front and back are, of



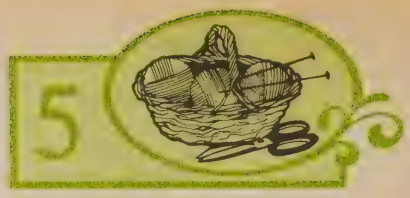
course, worked separately, and the pieces are joined when you join the sleeve seams.

For a cardigan, you may stop the front yoke with a hiccup on either version when you come to the center front. Cast on again and continue as described.

The lower fronts of a garter stitch cardigan may be made indescribably elegant if you shape a curve using the following method:

When one front is about 3″ shy of the wanted length, K8, K2 tog at the front edge every second row. Do this four times (4 stitches decreased away). Now, starting at the front, *K7, K2 tog, turn, K8, turn, K8, turn, K8. Repeat from * four times in all. This achieves the curve. Now, *K7, K2 tog, turn, K8. Repeat from * across the lower edge, then across the back, and weave to the border on the other front.

I've just finished a Hand-to-Hand Sweater in a child's size, without the cable but with a bold stripe of contrasting color. By making it quite long, and widening the body slightly and gradually toward the lower edge, it could make an enchanting dress for a little girl, especially in the garter stitch, because of the contrast of the horizontal and vertical ridges. If you make the neck in the exact center of the yoke, the garment may be worn inside out, outside in, back to front, or front to back!



SLIPPERS IN AN AFTERNOON

Marlene Vidibor

You can crochet these slippers in one afternoon, and the results will keep your feet toasty warm as you pad across cold hardwood floors or frigid linoleum.

What's more, you can easily make the bootees ankle height by picking up stitches around the upper edge and adding crocheted rows, much as you'd do when forming a sweater sleeve. If you start adding these rows at the back seam, you'll wind up with pull-on bootees . . . and if you add them beginning at the front seam, you'll get a slipper with an open seam that can be overlapped and fastened. You can even make enough extra "sock" above the ankle so that you can turn down or cuff the foot coverers.

In designing this slipper, I've used a technique that helps to shape the bootee, but you can eliminate this step, if you wish, without causing any noticeable harm to the item's appearance.

DETAILS, DETAILS

Materials: Three ounces each of two colors of worsted-weight yarn. (I used two strands of yarn twisted together as one to obtain a tweedy effect, which helps to hide spots and dirt. If you feel intimidated by the idea of crocheting with a double thread, substitute some heavyweight or rug yarn.) You'll also need a size K crochet hook, a tape measure, and a large-eyed tapestry needle.

Sizing: This particular pattern fits an "average" adult woman. You can vary the width and length to yield a bootee suitable for a typical man or child. Before crocheting, you'll need to measure one of the feet to be shod from its heel to the tip of its big toe. Jot down that figure for future reference.

To start: Beginning at the heel, chain 22 stitches, leaving a 10″ yarn tail at the start. Turn the work.

Row 1. Double crochet in the fourth stitch from the hook and in the next 5 sts (7 dc total, including the ch 3 at the beginning of the row). Dc twice in each of the next 2 sts, dc in the next st, dc twice in each of the next two sts, and dc in the remaining 7 sts. You'll have made a total of 23 dc, including the ch 3 at the row's start.

Row 2. Turn your work by ch 3, and dc 7. In the eighth stitch, dc 2 together, dc 7, and in the next stitch dc 2 together.

Row 3. Turn by ch 3 and dc across the row. Continue by alternating Rows 2 and 3 until the length is 1″ less than the measurement you took. (Bear in mind, though, that it's better to make a slipper that is somewhat larger, rather than smaller . . . in case you want to wear a pair of socks underneath.)

Note: Use of the double crochet stitch in two spots in every other row is the shaping technique I mentioned. If you desire, you can eliminate this stitch and merely dc across *every* row instead.

When you've obtained the length you want, turn your work, and dc 2 together across the row. Finish with a slip stitch, leaving a 10″ yarn tail.

TYING IT ALL UP

Use the yarn tail at the toe—threaded through a tapestry needle—to weave the edges together for 4 rows, working from the wrong side. Do the same at the heel, using the yarn tail to weave together the back seam. Once that's done, turn the bootee right side out.

Here's how to fashion a drawstring to make the slipper fit more snug: Start by chaining a 30″ strand. Weave this shoestring in and out of the ankle edge of the double crochet stitches around the slipper's edge, starting and ending at the front. Draw the string tight to adjust the fit, and tie a bow.

If you've decided to make ankle-height bootees, omit the drawstring until later. To make the additional crocheted rows, pick up the double crocheted stitches along the top edges of the sock and dc more rows. After you've finished building up the slipper's cuff, you can weave the chained drawstring through the double crocheted openings at any height you desire.

You'll need to repeat the whole process to make bootee number two. You can then slip on your afternoon project—look at that, the winter sun's still poking through the trees—and get ready for your evening activities! ❁

RAINBOW CROCHETED SWEATER

Marlene Vidibor

The Rainbow Crocheted Sweater is an easy garment to make—even though I found out that it's a bit difficult to *explain*—since the bulk of the work requires only one stitch, the double crochet. (You will have to chain, single crochet, single crochet 2 stitches together, and make a slip stitch in a *few* places.) Adding to its simplicity are the facts that there are only two seams—running across the shoulders and down the sleeves—to be sewn together and no mind-numbing increasing or decreasing of stitches is required to shape the cardigan. Altogether, then, it's an excellent project for someone making a sweater for the first time.

In constructing the model shown here, I used a variety of yarns—including such different weights and textures as worsteds, mohairs, orlon, doubled sport-weight, and even quadrupled cotton crochet thread—and arranged the multicolored bands in such a way that the warm colors at the bottom gradually shade into the cooler hues at the top. You can vary the width of the stripes if you like . . . and, of course, the color choice is entirely up to you. I made my color changes randomly on the front and back of the sweater, but you can change them when you start a new band if you prefer. Just be sure, whenever you add a new color, that the knot where you join the new and old yarn is on the wrong side of your work, so you can weave the thread unobtrusively into the fabric when you're finished.

One of the things I like most about this pattern is that it can be easily modified. You can make the sweater coat length, three-quarters length, or waist length . . . and change the sleeve measurement without much fuss, as well. One easy finishing touch you might want to add is a puffed or ruffled sleeve. To make this, merely chain a 15″ strand, thread it through one of the double crocheted rows near the end of the sleeve to achieve the effect you desire, and then tie the chain in a bow. You can even weave a piece of color-coordinated elastic through the sleeves to fasten them more tightly.

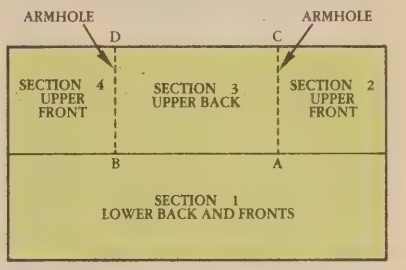
GETTING GOING

Materials: Twenty ounces of worsted-weight yarn (or an assortment such as I mentioned previously) for a small or medium sweater or 24 ounces for a large one, a size K crochet hook, and a tape measure.

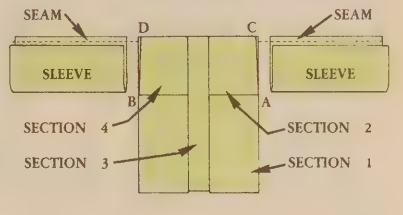
Sizing: Small = 32″–34″, medium = 36″–38″, and large = 40″–42″. Since there is no shaping in the bust area, there's no reason why this sweater can't be made for a man or a child . . . so I'll tell you at the end of the article how you can modify these instructions for making sweaters that are even smaller or larger than the one specified. The directions I'll give now are for a woman's small garment, with the changes for a medium or a large sweater written in parentheses.

To start: Begin at the bottom—Section 1 in the accompanying drawings—by ch 105 (117, 129). Turn and dc in the fourth stitch from the hook all the way across. This will yield 102 (114, 126) sts, including the ch 3 at the beginning of the row, which will always count as the first dc of the row. Repeat the double crochet rows until the section equals the distance from the lower "end" you choose—waist, hip, or whatever—to 2″ below your armpit. The hip-length sweater illustrated required a 13″ first section for a person five feet tall.

THE BODY OF THE RAINBOW CROCHETED SWEATER



THE BODY AND SLEEVES OF THE RAINBOW CROCHETED SWEATER



Shaping the first armhole and the front (Section 2): Turn, and complete 24 (27, 30) dc, including the ch 3 at the beginning. Turn and repeat this row until this section is long enough to reach from 2″ below the armpit to the base of the neck. Use a slip stitch to bind off the last stitch. On the sweater illustrated, this section measured 9″.

The back (Section 3): Attach the yarn at the base of the armhole (A), ch 3 and dc across 54 (60, 66) sts, including the ch 3. Continue the pattern stitch until the back section measures long enough to reach to the nape of the neck. Bind off with a slip stitch.

Making the remaining armhole and front (Section 4): Attach the yarn at the other armhole (B), and crochet as you did the first front section until this piece reaches the base of the neck.

You'll notice that the back section between the armholes has 54 sts, while each front piece has 24 (27, 30) sts, for a total of 48 (54, 60) sts across the front. The 6-stitch or 3″ gap remaining in the front will be closed later by a placket that's formed on the cardigan. This placket is also useful for adjusting the sweater to fit smaller or larger people.

Now, place the sweater against your body, or compare it with another garment that fits you, to be certain you've allowed adequate depth in the armhole to provide unrestricted movement (or another layer of clothing). Keep in mind that it's better for the garment to be a little too big than too small.

Sleeves: You'll begin the first sleeve at the upper edge of the front side of the armhole (C). This work will become the outside of the sweater, and unless you

have a preference, either side of the fabric will do fine. Just make sure that the side on which there are knots from changing yarn—if you're making a multicolored cardigan—is designated as the wrong side.

Examine the side edge of the double crochet stitches along the sleeve carefully, spreading them a little with your fingers. You'll see a series of openings, with two on each side of each double crochet stitch.

To begin the sleeve, secure the yarn to the first opening, ch 3, and then dc in each opening. Fill in the armpit with two dc stitches. The total number of sleeve stitches for the model shown was 66.

Once the first sleeve row is finished, turn the work, ch 3, and repeat the dc back and forth across rows until the sleeve is the desired length. (To check the length, baste the shoulder seam—14, 16, or 18 sts, depending on the size—and try the sweater on.) Remember that the length of the sleeve should accommodate the movement of the arm in all directions. On the model shown in the photo, the sleeve length came to about 17″.

You'll note while making the sleeve that the cardigan has a *dropped* shoulder, and the sleeves begin about 2″–3″ below where a more common set-in sleeve would start.

To fashion the second sleeve, attach the yarn on the outside of the sweater at the upper back side of the other armhole (D) and dc back and forth as directed for the first sleeve until the second sleeve is the same length as the first one.

Joining: There are only two seams in this sweater, running across the shoulders and down the sleeves. Select a yarn to use for these seams, as well as for trimming the neck opening and making the front placket.

With the front of the sweater facing you, join the yarn at the left wrist. Fold the sleeve evenly along its length so that the shoulders match at the side edges. Now, sc along the folded sleeve, working one stitch in every opening along the sleeve seam.

When you arrive at the shoulder, sc across 14 (17, 20) double crocheted stitches. For this section, you'll sc in the tops of each pair of corresponding dc from each shoulder.

To make the other (right-side) seam, attach yarn to the shoulder edge at the 14th stitch, and sc down to the wrist. That way, your seam stitches will all run in the same direction.

Front placket: Beginning at the lower right front edge, work as follows: Sc in each of the first 3 openings along the double crocheted sides, then sc the next 2 openings together. Repeat this pattern to the neck edge. For the left corner, sc 3 in the last opening, then turn the corner and sc around the neck. For the right corner, sc 3 in the last stitch. Now, turn the right corner and sc 3, then sc 2 together as you did for the opposite edge until you reach the bottom of the sweater. Turn, ch 3, and dc along the left front to the left corner. Turn and sc along the neck edge.

OK, turn the right corner, ch 3, and dc down the right front. Turn, ch 3, and dc up the right front to the right corner. Turn the right corner, and sc around the neck edge to the left corner. Ch 3, and dc along the left edge to the bottom. Turn, ch 3, dc up the left edge, and sc around the neck edge. Next, dc down the right edge. Turn to the bottom edge and sc all around the bottom to the other corner. End with a slip stitch.

FINISHING

You can place buttons and buttonholes on your cardigan, using the following method. Space the buttons evenly along the outer row of the front placket (buttons go on the left edge for men's clothing, on the right side for women's), and sew them on. If you want, you can bind buttonholes with ribbon or yarn in the spaces provided by the double crochet stitches along the opposite edge of the sweater.

Draw all the knots to the wrong side of the sweater, using a smaller crochet hook (size E works well), and draw the yarn tails of the knots through the bottom of a series of double crochet stitches.

Sleeve fastenings: Chain a short length of yarn . . . one that's just long enough to squeeze over the button of your choosing. Leave 3″–4″ yarn tails on both ends of the chain. Secure the loop-to-be to the bottom of the sleeve seam. Fold the sleeve in half and sew a button to the bottom of the sleeve. In order to snug up the sleeve, all you have to do is pass the loop over the button.

Adjustments for different sizes: For each inch less than a 32″ chest measurement (ladies' small), subtract 3 sts from the 105 starting sts. Remember that this starting number includes the ch 3 for the first dc. Thus, if your child's chest measures 28″, subtract 12 sts from 105, which works out to 93 sts on the chain. Subtract 3 sts more to account for the ch 3, which leaves 90 sts to be double crocheted in the first row.

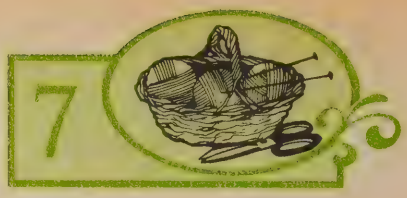
To arrive at the number of stitches to allot to the front and the back of the sweater, use the following method: Since the front placket always measures 3″ wide—or 6 sts—first take your total number of stitches and add six. Using the preceding example, this would be 90 + 6 = 96 sts.

Then divide the resulting figure by 2. (Example: 96 ÷ 2 = 48 sts.) That number will be the back length . . . so the back in this instance will have 48 sts.

Now, subtract the number of stitches for the back from the original stitch total *without* the front placket. (90 – 48 = 42 sts.) Divide the difference by 2 to find the length of each front section. (42 ÷ 2 = 21 sts for each front section.)

To make the sweater *larger* than the one I've used as an example, *add* 3 sts per inch and follow the same sequence of calculations.

And that's it . . . you now have your very own "sweater of many colors"! ●



THE LOG CABIN PULLOVER

Annette Lep

It seems that the most interesting craft projects combine several arts, and this pullover sweater is no exception. It's a crocheted version of a traditional *patchwork* pattern . . . known as the "Log Cabin". The multicolored yarn and the challenging layout should keep a crocheter intrigued throughout the entire project. And like its authentic patchwork predecessors, which made use of various scraps of cloth from the ragbag, this sweater economically employs odds and ends of yarn.

This garment is a lady's medium-sized pullover, fitting sizes 8–12. The finished sweater has a bust measurement of 40″ and a shoulder to bottom-edge length of 21″.

Materials: To make this pullover, you'll need the following amounts of yarn (I've suggested some colors, but you can substitute any hues as long as you apply the basic principles of moving from "sunshine to shade"—or light to dark tones—commonly used in the "Log Cabin" pattern). To follow my hue pattern exactly, you'll need eight ounces of burgundy (code letters F/FF on the color chart) . . . two ounces each of taupe (G) and white (GG) . . . one ounce each of pale apricot (E), beige (EE), dark brown (D), navy blue (DD), light gray (C), and light blue (CC) . . . half an ounce each of deep purple (B) and dark green (BB) . . . and small amounts of red (A) and turquoise (AA). You'll also need a size H crochet hook (or the appropriate size to give you the following gauge) and a large-eyed tapestry needle.

Gauge: 4 single crochet equal 1″ and 4 rows of single crochet equal 1″. A finished Log Cabin square should measure 9″ square.

PATCHWORK CROCHET

Start your sweater by making four Log Cabin No. 1 blocks, using colors A through G and arranging them as shown in Fig. 1. Then crochet four Log Cabin No. 2 blocks, using colors AA through GG, and arrange the colors as shown in Fig. 1. (Note: The side of the work facing you as you work Row 1 and Row 3 of each band will be the right side of the piece. When it's time to change colors, always

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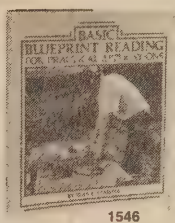

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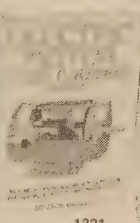

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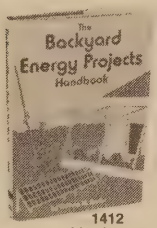

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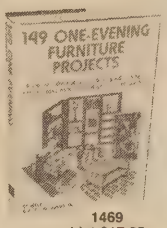

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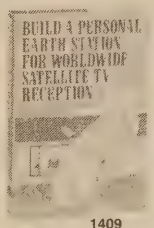

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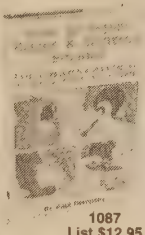

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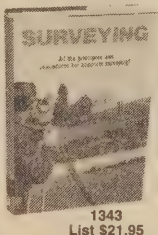

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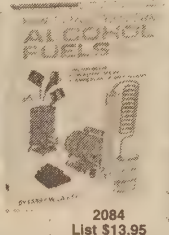

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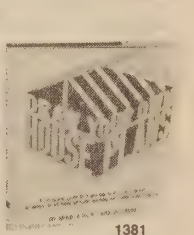

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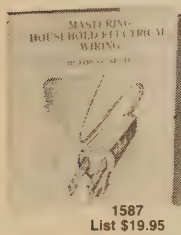

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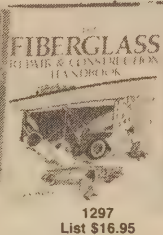

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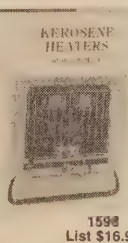

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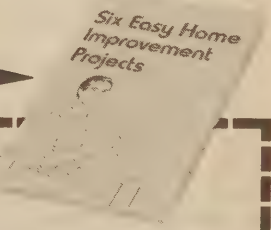

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attach the yarn from the reverse—wrong—side. The first row of Band 2 and of each succeeding band is worked by picking up stitches along a side edge of the piece . . . always pick up these stitches evenly and work the last stitch of the row in the very corner of the piece. To eliminate the need for weaving in the yarn ends after each block is completed, work the ends in as you crochet.)

The following directions apply to each of the eight squares. To start the center of the block, ch 6, then work 5 sc across each row for 5 rows (remember that in single crochet you ch 1 st at the end of a row to turn the work). Now, with the center square done, you'll crochet 12 colored bands, each of which will consist of 5 rows of single crochet.

Band 1. Work 5 sc across each row.

Band 2 and Band 3. Work 10 sc across each row.

Band 4 and Band 5. Work 15 sc across each row.

Band 6 and Band 7. Work 20 sc across each row.

Band 8 and Band 9. Work 25 sc across each row.

Band 10 and Band 11. Work 30 sc across each row.

Band 12. Work 35 sc across each row.

Block the squares to the same size.

PUTTING IT ALL TOGETHER

To make the back of the sweater, arrange two Log Cabin No. 1 and two Log Cabin No. 2 blocks as shown in Fig. 2. Slip-stitch them together, working from the right side. Be sure to crochet through *both* loops.

Yoke: With the right side of the work facing you, attach burgundy (F) at the upper right corner. Ch 1.

Row 1. Pick up and work 70 sc across the top edge of the piece. Ch 1, and turn.

Row 2. Work even in sc (70 sc), marking the 23rd sc with a safety pin. Ch 1, and turn.

Now it's time to shape the right shoulder.

Row 1. Sc in each of the first 23 sc. Ch 1, and turn.

Rows 2–5. Work even in sc (23 sc). Ch 1, and turn. End the section off after completing the last sc in Row 5.

Once that's done, it's time to form the left shoulder. With the right side of the work facing you, attach burgundy (F) along the top edge at the pin marker. Ch 1.

Row 1. Working along the upper left corner, pick up and work 23 sc along the top edge. Ch 1, and turn.

Rows 2–5. Work even in sc (23 sc), ch 1, and turn. End the section off after completing the last sc in Row 5.

Assemble the *front* part of the sweater in the same manner as you did the back.

THE FINISHING TOUCHES

Slip-stitch the shoulder seams together working from the right side. Be sure to crochet through the *inner* loops only. Then complete the following steps.

Right side edging: With the right side of the work facing you, attach burgundy (F) at the lower right corner of the back section. Ch 1.

Row 1. Pick up and work 150 sc along the side edge of the back and front sections. Ch 1, and turn.

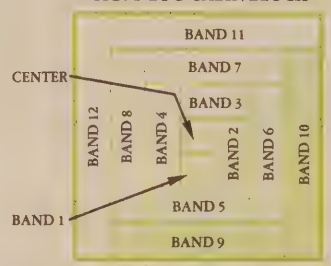
Rows 2–3. Work even in sc (150 sc). Ch 1, and turn.

Row 4. Work even in sc (150 sc). Mark the 51st and 100th stitches of the row with safety pins. End off.

Left side edging: Work as for the right side edging, except attach the yarn at the lower left corner of the front section.

Right sleeve: With the right side of the work facing you, attach burgundy (F) at the pin marker along the right side edge of the back section. Ch 1.

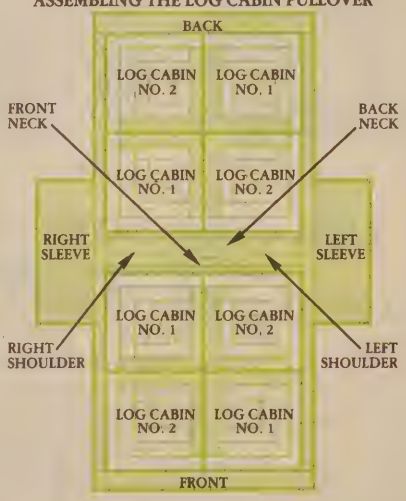
FIG. 1 LOG CABIN BLOCK



NOTE: SINGLE LETTERS INDICATE COLORS TO BE USED IN LOG CABIN NO. 1 BLOCKS. DOUBLE LETTERS INDICATE COLORS TO BE USED IN LOG CABIN NO. 2 BLOCKS.

= DARK BROWN (D) NAVY BLUE (DD)
= RED (A) TURQUOISE (AA)
= PALE APRICOT (E) BEIGE (EE)
= DEEP PURPLE (B) DARK GREEN (BB)
= BURGUNDY (F) BURGUNDY (FF)
= LIGHT GRAY (C) LIGHT BLUE (CC)
= TAUPE (G) WHITE (GG)

FIG. 2
ASSEMBLING THE LOG CABIN PULLOVER



Row 1. Working along the right side edge of the back and front sections, make 50 sc between the two pin markers. Ch 1, and turn.

Rows 2–20. Work even in sc (50 sc). Ch 1, and turn.

Left sleeve: Work as for the right sleeve, except attach the yarn at the pin marker along the left side edge of the front section. Once the left sleeve is finished, slip-stitch the side and underarm seams through the *inner loops* only.

Neck edging: With the right side of the work facing you, attach burgundy (F) along the neck edge at the right shoulder seam. Ch 1.

Round 1. Pick up and work 5 sc along the right back shoulder. Work 24 sc along the back neck edge. Work 10 sc along the left shoulder. Work 24 sc along the front neck edge. Work 5 sc along the right front shoulder. There should be a total of 68 sc around the neck edge. Mark the last sc of the round with a safety pin. (As you complete the last sc of each succeeding round, remove the pin marker and reinsert it in the new stitch just formed.)

Round 2. Sc in each of the first 3 sc and (work the next 2 sc together) two times. Sc in each of the next 20 sc and (work the next 2 sc together) two times. Sc in each of the next 6 sc and (work the next 2 sc together) two times. Sc in each of the next 20 sc and (work the next 2 sc together) two times. Sc in each of the next 3 sc. You should have made a total of 60 sc.

Round 3. Sc in each of the first 3 sc, work the next 2 sc together. Sc in each of the next 20 sc, work the next 2 sc together. Sc in each of the next 6 sc, work the next 2 sc together. Sc in each of the next 20 sc, work the next 2 sc together. Sc in each of the next 3 sc. You should have made a total of 56 sc. End off.

The lower edging: With the right side of the work facing you, attach burgundy (F) along the bottom edge at a side seam. Ch 1.

Round 1. Pick up and work 156 sc around the bottom edge. Mark the last sc of the round with a safety pin. Be sure, as mentioned before, to remove the pin marker and reposition it in the new stitch whenever you've completed the last sc of a round.

Round 2. *Work first 2 sc together, sc in each of the next 2 sc. Repeat from * all the way around the sweater. You should wind up with 117 sc in Round 2.

Rounds 3–6. Work even in sc to obtain 117 sc.

Round 7. Work even in sc (117 sc). Slip-stitch into the first stitch of the round and end off.

Well—or *whew*—you're finished! You can weave any remaining yarn ends into the back of the work and block the garment lightly with a steam iron if necessary. Then pull your piece of colorful contemporary Americana on . . . and give your friends a show!

EDITOR'S NOTE: This article was adapted with permission of the author from Crocheting Patchwork Patterns: 23 Granny Squares for Afghans, Sweaters & Other Projects *(Dover, $2.50). The book is available for its list price—plus 75¢ shipping and handling for one copy, or $1.25 for two or more copies—from Dover Publications, Inc., Dept. TMEN, 11 East Second Street, Mineola, New York 11501.*

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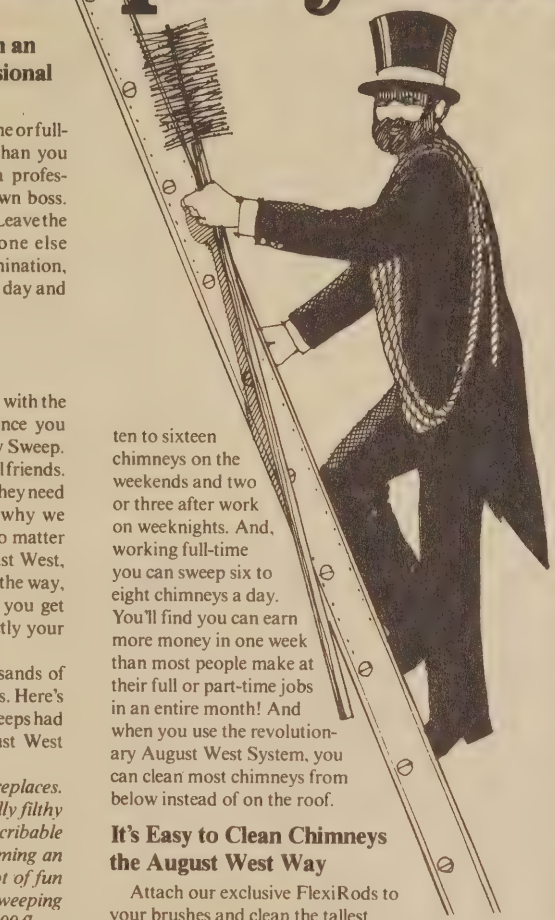

Start your own business and earn an extra $700.00 a week as a Professional Chimney Sweep

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The August West System provides you with the training, equipment and start up guidance you need to become an independent Chimney Sweep.

We like to think of our sweeps as special friends. Friends who can depend on us whenever they need help managing their business. That's why we encourage you to write or give us a call no matter what kind of support you need. At August West, advice is always available... and free. By the way, you pay only for the system that helps you get started. All the money you make is strictly your own.

In the last 8 years, we've helped thousands of men and women get started in this business. Here's what Chris Nestor of Classic Chimney Sweeps had to say about his business and the August West System...

"My first day on the job, I cleaned 7 fireplaces. Even though I struggled a lot and got really filthy on those first few jobs, there was an indescribable feeling of accomplishment. I was performing an important public service and having a lot of fun doing it! I decided then, that chimney sweeping was the life for me. After sweeping over 8,000 flues, I still look forward to going to work every morning — six days a week, all-year round.

I met with almost immediate success. The August West handbook was invaluable in helping my wife and I set up our 'own business.' We followed the handbook's suggestions on scheduling, advertising and promotion and still do today.

With profits from just one year of sweeping, we were able to purchase 2 additional sweep vehicles, another 'Soot Sweeper' and a brand new van. This year we have expanded into wood and coal stove installations, chimney relining and accessory sales. We have more than 2,000 regular customers and the list grows every day!

We owe a debt of gratitude to August West for helping to make our dreams come true."

Christopher Nestor
Wellesley Hills, Mass.

Chris's success can be yours. With a little effort, you can make your business just as profitable. Remember, we give you the support you need to get started and keep supporting you with free telephone consultations, regional workshops, bi-monthly newsletters and all the help you need to get and keep customers.

You Can Make $45.00 An Hour!

Using the August West System, you can complete a typical chimney cleaning job in less than an hour. Most sweeps charge $45.00 to $50.00 to clean a chimney. Even as a part-timer you can clean ten to sixteen chimneys on the weekends and two or three after work on weeknights. And, working full-time you can sweep six to eight chimneys a day. You'll find you can earn more money in one week than most people make at their full or part-time jobs in an entire month! And when you use the revolutionary August West System, you can clean most chimneys from below instead of on the roof.

It's Easy to Clean Chimneys the August West Way

Attach our exclusive FlexiRods to your brushes and clean the tallest chimneys from the safety of your customer's livingroom. And when it's necessary to go on the roof, our roof safety equipment and perfected techniques give you all the confidence you need to complete the job quickly . . . and safely.

But the key to the August West System is our SootSweeper®. With ability to move air that's 7 to 10 times greater than any shop vac, it creates a powerful draft in the fireplace. Your customers can actually see this powerful machine pulling in every particle of dust. They'll know instantly, their home will be spotless when you're gone. Quite honestly, the SootSweeper® really impresses folks and makes repeat business a sure thing. It says you're a professional — loud and clear!

And there's more to our system. You'll receive eight of the most needed chimney brushes. Six sections of FlexiRod®. Roof Safety Equipment. A Weight Kit and Rope. Tool Caddy. Even the top hat you'll need for creating the right impressions (and to bring you "sweeps" luck).

You also receive an easy-to-follow manual with everything you need to know from advertising and promoting your business to cleaning chimneys and home fire safety. Plus, you receive free telephone consultations anytime you need them, a free bi-monthly newsletter, invitations to regional workshops, and eligibility for our sweeps group insurance plan, and much more.

You're Needed to Prevent Dangerous Chimney Fires

Clean chimneys are safe chimneys. Fortunately, most homeowners realize this. But there simply aren't enough sweeps to serve the country. Unlike oil and gas, wood smoke leaves two dangerous by-products in the chimney — soot and creosote. When a quarter-inch of this highly flammable mixture cakes chimney walls, a real problem exists. One tiny spark can ignite it and suddenly the chimney becomes a blast furnace. In seconds, it looks and sounds like a rocket taking off. The 2000° to 3000° temperature of the chimney fire is enough to disintegrate the mortar holding the bricks together. Flaming balls of soot can shoot out the chimney's top and land on the roof starting a fire that causes extensive property damage. Innocent people can die.

Sweeps Are in Demand

Due to the high cost of oil and electric heat, millions of Americans have turned to wood for heating their homes. The number of wood stoves and fireplaces installed in homes across the United States increases every year. And this translates into golden opportunities for the sweeping business. In fact, right now there's a need for over 20,000 sweeps to clean the nation's forty million chimneys.

Every time you clean a chimney, you're saving lives and educating your customers on the importance of burning wood cleanly and safely. It's no wonder that chimney sweeps are fast becoming the recognized symbol for home fire safety . . . much as "Smokey the Bear" is for forest fire protection.

Learn More About This Affordable Dream

Sweeping chimenys is tough, yet rewarding work . . . and the pay is exceptional. The demand is steadily growing and new equipment and methods make the job far easier, faster and safer. Perhaps best of all, this is one of those "dream" businesses that so many of us are always looking for: a business with flexible hours where you're the boss.

To find out more about the high earnings potential and other benefits you can enjoy as a professional Chimney Sweep, just call TOLL-FREE 1-800-243-5166 and ask for extension 160 Or mail the coupon below.

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BARTERS & BOOTSTRAPS

In the interest of promoting one of humankind's better ideas—barter—we announced in issue 37 our still-standing offer: Send us a short account of an actual barter (write to Successful Swaps, THE MOTHER EARTH NEWS®, 105 Stoney Mountain Road, Hendersonville, North Carolina 28791), and if we print it in this column, you'll receive a one-year subscription (new or extended) to MOTHER.

Likewise, if you now operate, or have ever operated, a successful home business that was inspired by an article you read in MOTHER, tell us about it in approximately 500 words (write to Bootstrap Businesses, THE MOTHER EARTH NEWS®, 105 Stoney Mountain Road, Hendersonville, North Carolina 28791). Be sure to mention how you started your bootstrap business—including how much seed money you needed—the amount you make (net), and anything else that might be of assistance to other entrepreneurs. If your story is used in this column, you'll receive a free two-year *subscription to MOTHER.*

About a year ago, my husband was laid off from an unfulfilling and frustrating job as a cook in a local restaurant. Since the only income we had then was an occasional meager paycheck from my part-time secretarial work, he frantically went from door to door, looking for odd jobs. It was a pretty hard time for the two of us . . . and it took a lot of effort to keep up with our bills. But, like many other folks in these depressed economic times, we kept our chins up and went on plugging away.

After a couple of months of doing everything from painting doghouses to sweeping sidewalks, my husband used his truck to move a friend's parents to a new home. They couldn't afford to pay him cash, so he agreed to swap his work for an old wooden fishing boat. I must admit that I was rather perturbed when he arrived home with the well-worn craft. I'd expected some much-needed money for his day's labor, but all he had to show for it was a boat that we could use only if we drove 20 miles to the nearest fishing hole!

Well, my husband placed an ad in the paper, offering to trade the vessel for anything of similar value. A call from an avid young fisherman precipitated a swap of the boat for a lawn mower . . . something my mate had been wanting for a long time so he could start his own grass-mowing business.

Now, nine months later, he has done so well trimming lawns around the area that he works at it practically full-time, exchanging his services for just about anything our neighbors have to offer, from food to automobile parts . . . and even cash! In short, he's bartered his way from unemployment to a satisfying and enjoyable occupation.

W.A.
Oregon

As an impecunious artist, I've had many opportunities to find creative ways to obtain needed or desired goods or services by barter. My past trades have ranged from swapping weight-lifting lessons for haircuts to exchanging used furniture for the use of a pickup truck.

My most successful trade to date, though, fulfilled a long-time dream. I've always been interested in the martial arts but never had the extra cash to take lessons. And trying to teach myself with the help of books, magazines, and movies just wasn't satisfactory.

Then one day I drove by a neighborhood karate studio that had plain white Masonite panels covering the windows. It seemed to me that a window mural would attract students and make the facade more appealing, so I contacted the master and offered to paint a mural in his front window in exchange for lessons.

Since the owner had been thinking along these lines himself, he was enthusiastic about my suggestion, and we made a deal when I produced a drawing he liked. Now, he has an attractive window, which has helped build up business, and I have eight months of free lessons to my credit.

C.A.M.
Pennsylvania

I never could find time to do my ironing (primarily because it was a chore I disliked), and had been paying a friend to do it for me.

Then one day when I mentioned that I was crocheting an afghan, my friend asked to see the coverlet when it was completed. She really liked my handiwork, and—after a little discussion—we decided to trade: my afghan for 120 ironed shirts!

J.S.
Oklahoma

The trim on my house needed painting, but—since I'm 71 and in poor health—I was unable to get a job to earn the extra money to have it done.

However, my problem was solved when a couple of young fellows I knew told me of their desire to start a business doing painting, carpentry, and snow shoveling from roofs. They couldn't afford a phone, so I let them use *my* number and took messages for them (this was something I *could* do). In exchange, they agreed to paint my trim . . . furnishing labor, paint, and ladder.

Their business has prospered (now they have their *own* phone), and I have freshly painted house trim.

Mrs. K.L.W.
New York

Finding ways to earn money seems to be especially difficult in small towns and rural areas, but with the help of Larry Ketchum's article, "How to Make Money from the News" (issue 18, page 68), I've found a venture that actually works *best* in lesser-populated locales.

Relying on the experience I gained working as a volunteer in the newsroom of a local nonprofit radio station, I landed a job as a "stringer" (a part-time reporter who works on assignment and is usually paid on a per-job basis) covering events in and around my small town for a station in a city about 15 miles away.

You see, while most radio stations broadcast over fairly large areas, their news staffs are severely limited, so—instead of sending a full-time reporter to chase stories around the entire coverage region—the news directors rely heavily on part-time help to cover local happenings throughout the stations' listening zones. I regularly cover city council meetings, public hearings, and other matters of concern to the community.

The only mandatory expenses of the job are notebooks and writing implements. I can walk to most of the places I need to get to in town, and can call my stories in—collect—to the radio station from any pay phone. I'm paid $20 for meetings and local election coverage, and make $10 per story for coverage of other events . . . and almost all of that is profit.

M.V.
Colorado

For several years we'd had an active interest in raising hardy nut trees, but it wasn't until we read about one man's devotion to restoring the American chestnut (see "Save the Chestnuts!" by Jack Reeder on page 122 of MOTHER NO. 71) that we considered turning what had been a hobby into a money-making enterprise.

Our first step was to contact several nurseries that sold nut trees. We discovered that young grafted saplings were expensive and in short supply . . . primarily because grafting trees is difficult and the specimens propagated in this manner require a year or two more nursery care than do trees raised from seed. Next, we contacted the appropriate state agencies to inquire about inspection and licensing requirements, which we found were no more rigorous than for other crops.

The following spring, armed with the information, we invested about $100 in seed for pecan, butternut, chestnut, and filbert trees. This, combined with some carpathian and a large number of black walnut seedlings that we already had growing, gave us the beginnings of our first nursery crop. When fall arrived, we bought another $150 worth of seed in order to build and maintain our supply of trees.

The next year we began grafting carpathian and black walnut varieties onto black walnut rootstocks. After that good growing season, we were ready to open for business. We purchased our nursery license ($10), had some price lists printed ($30), and placed several advertisements in regional gardening papers. Response to our ads brought in $850 . . . and the busy spring ordering season was still a full four months away!

Because of the response, we're hoping we'll eventually be able to devote a much larger portion of our time to our nursery venture, and that this enterprise can help our farm become truly self-supporting.

J.M.
Indiana

Homeowner Drills His Own Backyard Water Well

A tip from his wife turned into a money-saving hobby.

Interview with Capt. Charles Anders, Airline Pilot

I'm Rex Roach, Factory Sales Manager of DeepRock Mfg. Co. Today I'm talking with Capt. C.H. Anders of Atlanta, Ga. who who is an airline pilot. Capt. Anders, you purchased a Hydra-Drill about 3 months ago. Are you having pretty good luck?

A. Yes, I haven't drilled a well yet that I didn't hit water, so I consider that pretty good luck.

Q. Capt. Anders, what made you decide to drill your own well? Why not hire a commercial driller?

A. I had planned to do that. Then my wife saw this ad about the Hydra-Drill and how you can drill your own well. She was kidding me about it because I had told her how I helped dig a well when I was a boy. But I got the literature and it was so interesting I decided to order one.

Q. How many wells have you drilled?

A. Four — actually, I'm drilling the fourth now, and it looks very promising. I'm already down about 75 feet, and I'll probably go another 30 or 40 feet. I expect to get about 600 gallons of water per hour at that depth.

Q. Is that good?

A. Around here, it sure is. Some of my neighbors hired commercial drillers and got about 300 gallons per hour.

Q. That's a lot of water. Why do you need more?

A. Well, for irrigation — you know, flowers and sprinkling the lawn and things like that. This is a dry area. We just don't get a lot of rain like other parts of Georgia. In fact, we've really had a drought here for over a year, and a lot of people have had a well drilled recently.

Q. But you had never drilled a well before?

A. No, but I saw how simple it is. It's really fascinating how this Hydra-Drill works. It's not complicated, and it's very easy to operate. Anyone could do it.

Q. Could you drill a well by yourself?

A. Yeah, if my neighbors would let me. Every time I start drilling, they come drifting over wanting to help. It's more like fun than work and everybody wants to try it.

Q. What do your fellow pilots think about your well drilling?

A. At first they thought it was a joke. Then they came out and saw the green lawn and all the sprinklers going full blast — they tried to buy the Hydra-Drill from me. I had to promise to drill wells for a couple of them.

Q. It sounds like you are getting into the well drilling business.

A. Not really. I plan to keep flying for a long time. This drilling wells for friends is just a hobby, and I'm enjoying it. The Hydra-Drill has already paid for itself so I'm doing it just for the fun of it. It's really something to see that drill go down, and when that water starts flowing, you feel like you've really accomplished something.

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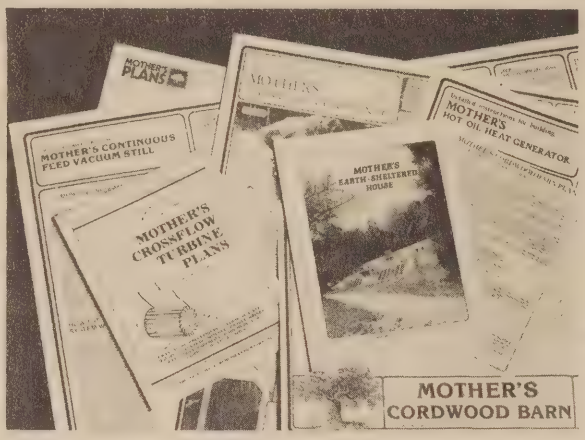

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OUR WINDOW-MOUNTED SOLAR HEAT GRABBER, that you can build for about $80, fits any standard window. It's a real solar furnace that can help warm any well-insulated room during cold, sunny weather, and you can build it in about a day. Detailed, point-by-point plans include wiring and airflow diagrams and step-by-step photographic instructions. You can build a lightweight vertical model or the more efficient angled collector. Our window-mounted solar Heat Grabber was featured in issues 54 and 78, and it has become one of our most popular do-it-yourself, home energy projects. **84012 $10.00**

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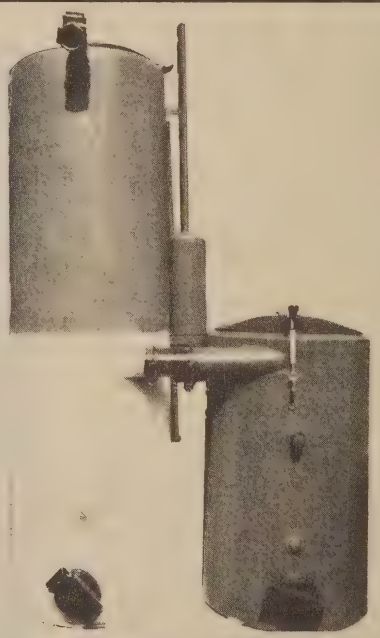
BUILD AN AMAZING HYBRID ELECTRIC CAR FOR AS LITTLE AS $2,000 using our plans. We featured this experimental vehicle in issue 65. An on-board battery pack enabled us to get 75 to 83 MPG at speeds ranging from 20 to 50 MPH in actual road tests. Our plans explain features important to all electric cars, and they tell how to analyze your own transportation needs in order to select the best components. The instructions detail many different options, such as the use of diesel engines, or two-cycle and four-cycle gasoline engines. You'll find step-by-step, detailed schematic diagrams, photographs, and carefully written instructions, a list of materials, a report on our hybrid vehicle experiments, and a list of suppliers to help you locate parts.

84018 $15.00

HERE'S OUR EARTH-SHELTERED HOME THAT YOU CAN BUILD FOR LESS THAN $10 PER SQUARE FOOT. Featured in issues 84 and 85, our 1,000-square foot earth-bermed house is a striking example of today's environmentally based energy-efficient technology. Its design lends itself readily to do-it-yourself techniques. Construction drawings include framing and rafter details, block layout, plumbing, electrical work, and all structural aspects for the owner-builder.

84035 $15.00



BUILD A WOOD-GAS GENERATOR TO POWER A TRUCK, OR PRODUCE ELECTRICITY AND HEAT YOUR HOME. You can convert any internal-combustion engine rated from 10 HP to 200 HP into your own home energy system using wood scraps for fuel. Or you can use a wood-gas generator, as we have, to run a truck. Our detailed instructions show you how to assemble this generator using recycled water heaters, and they supply you with a complete list of the necessary materials. The completed woodburner generates, cleans, cools, and mixes the gas before it introduces fuel into the engine. Featured in issues 69, 70, and 78.

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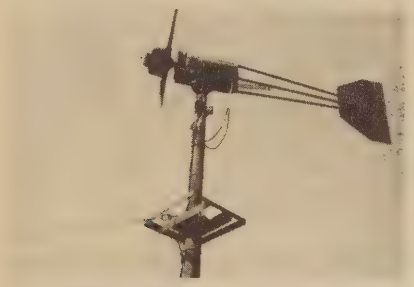
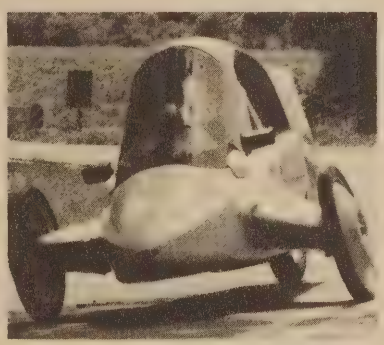


A WIND-DRIVEN ELECTRICAL GENERATOR that can supply most of your home's electricity can be built for a few hundred dollars. Our plans show you how to construct the entire windplant system, from shaping the blades to setting up the generator and gearbox ... from installing a governor/speed control system to battery-bank power storage and using inverters for DC to AC conversion for use with appliances ... and they describe numerous sources of used parts! **84033 $15.00**



OUR 3VG PERSONAL VEHICLE gives you a motorcycle's economy and a car's convenience. The 2-person 3VG, featured in issues 83 and 84, is a 3-wheeled vehicle powered by a 730-cc engine and equipped with a computer-controlled "lean" system that counters centrifugal force in curves. Our information package tells you how we developed the chassis, body, engine, drivetrain, interior, instrumentation, canopy mechanism, and the leaning system and its components. **84034 $20.00**

BUILD A 19,000-BTU-PER-HOUR SOLAR COLLECTOR. Our forced-air fiberglass collector can be attached to a south-facing wall of your home. The plans help you construct and install this 96-square-foot collector, and the instructions detail the fabrication of special tools for cutting foil-faced insulating board and for boring countersunk holes. **84026 $10.00**

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YOU CAN BUILD YOUR PASSIVE/ACTIVE SOLAR EARTH-SHELTERED HOME with the help of our information package that includes drawings for the earth-bermed, solar-heated My MOTHER's House and a 20-page book of building techniques and designs. Information is given on thermal-mass heat storage, cooling tubes, insulation and roofing materials. Detailed (but not architecturally approved) construction drawings can be applied to two different floor plans. (Plans do not include electrical or plumbing schematics, appliances, or cabinetry.) **84032 $15.00**

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DOWN-HOME COUNTRY LORE

"If you're as interested in energy conservation as I am," writes Paul Sheldon of Tampa, Florida, "you'd probably like to know how many hours per day your hot water heater is running. One easy, inexpensive way to monitor an *electric* heater is with an old wall clock. Cut the plug from the time-teller's cord and strip back the insulation on both wires. Attach one of these wires to the cold-side terminal of your water heater's thermostat switch, and ground the other on a cold-water pipe. Then the clock will start running each time your water heater cycles on. By checking the clock's daily movements, you'll get an accurate log of your heater's 'juice use'!"

Susan Golombek offers the first of the following nonelectric-lighting tips. The Houston, Texas reader says that a surefire way to keep a stubborn melted candle stub from sticking in the bottom of its holder is to run a little water into the stand before you insert a new candle. Since the liquid will act as a "gasket", the holder won't overheat, the wax won't stick, and the melted stub will be easy to remove. . . . Bruce Klecka of Burbank, Illinois has found a way to convert his messy, "overflowing" candles into drip-proof light sources: He simply dips each of them into a solution of either salt water or soap suds, then puts the batch of light sticks into the freezer overnight. . . . And for those who use oil lamps, Penrose, Colorado's Dennis Mulso has a tip for saving fuel *and* wicks: "When your lamp oil's so low and your lamp wick's so short that the two don't meet, just pour some water into your lamp. The oil will rise to the top, where it can reach that shrinking wick. When the oil is completely gone, you can just pour off the water. This trick's saved me many a late-night trip to the store!"

Allyn Moise of Carson City, Nevada has a real penny-pinching suggestion for fabricating your own emergency washers (the nut-and-bolt type, mind you): "Just as I was about to finish up a deck-skirting project not long ago, I ran out of 1/4" washers. It was too late for me to run to town, so I drilled 1/4" holes in several pennies. My make-do copper washers worked great and cost me about half of what store-bought steel ones do!"

"If your mail carrier—like ours—throws everything to the back of the box, thus forcing you to get out of your automobile in rain, mud, snow, and cold," writes Saxonburg, Pennsylvania's Carol Blank, "do what we did: Build a 'mail dump'! Just cut a piece of thin plywood or Masonite to fit inside the bottom of the letter holder, fasten a 2"-high block of wood to the board's back end, and attach a small piece on the front edge to serve as a handle. Then you can just reach out of your car window, grab the slide-in tray, pull it out . . . and have your mail in your hand!"

Do you still have the Christmas tree around? If so, Pam and Donald Vilas of Silver Spring, Maryland have a holiday tradition they'd like to share with you. Pam writes, "Several years ago, when Don and I were first married, we wanted to find a way to remember each and every Christmas to come. After a while, we decided to let the Christmas tree itself record those annual memories. So each year we cut an inch-thick disk from the bottom of our yule trunk before we put the tree up. After letting the disk dry for a few days, we smooth its flat sides with fine-grit sandpaper. Next, we use a blunt lead pencil—ink tends to smear—and write the name of the street where we live, the year, and a special event, like a heavy snowfall or a new baby, that will act as a 'memory trigger' in the future . . . right on the round. After brushing the disk with a heavy coat of polyurethane, we attach a small screw-in hook to the top *and* a matching eye to the bottom to hold *next* year's memento. The chain of 'Christmas trees past' makes a uniquely personal holiday decoration!"

How about a triad of winter-clothing-care hints? First in line is Alfred Glenn, with a tip on caring for suede. The Boise, Idaho denizen says, "It's hard to keep those suede shoes, jackets, and coats looking good in winter. A back-to-the-basics method that works well for me involves rubbing cornmeal into soiled spots and then letting the sullied item sit overnight. The next day, shake out the cornmeal and use an emery board to lightly buff the cleaned areas. This inexpensive, easy treatment usually works as well as more costly chemicals and methods." . . . Jackie Joy Zandrews of Oelwein, Iowa has another old-time method of wintertime cleaning that can be used on those delicate *fur* garments: "Take them outside on a sunny winter day after a soft snow has fallen the previous night. Rub each fur vigorously in the snow—up and down, side to side, and in circles—and then lay the items out to dry in the sun, furry-side up. When the garments are dry, take them back inside and give them a good—though gentle—brushing. This 'powder treatment' works great and costs nothing!" . . . And finally, Milwaukee, Wisconsin's Mary Seramur-Kraiss has some good ideas for wool wearers: "Wool should always be hand-washed, and I've found the best detergent for the job to be hair shampoo. Wool is, after all, hair from a sheep, so it responds well to shampoo. What's more, if your woolen garment has become scratchy or stiff from improper washing, try soaking it in cream rinse! I use about half a cup of rinse per gallon of tepid water. Soak the clothing for two or three hours, periodically working the

solution of diluted cream rinse through it. Rinse the item in more tepid water and lay it out flat to dry. 'Sheep hair' garments treated with such respect will last a long time!"

Here are two tips from readers offering down-home country lore, Vietnamese style. When she attended an Oriental cooking class taught by a Vietnamese woman, Lynda Mason of Roseburg, Oregon learned a better way to prepare garlic. "It's much easier—*and* less frustrating—to bruise the cloves *before* you peel them. Just lay the garlic on a cutting board and give it a whack or two with the flat side of a wooden mallet or the handle of a large knife. The smashed skin will slip right off. You can then mince the pungent sections or use them as is. This system works on tiny cloves and elephant garlic alike." . . . And Susan Tran—a Spring Glen, Pennsylvania resident whose husband is Vietnamese—says, "When our chopsticks get old and warped, we recycle them for a variety of uses: to get the air bubbles out of full jars and to push fruit and vegetables into place when canning, to pick out hot coals from the ashes or arrange them to restart the fire, to prop open windows, and to stir paint."

Through the years we've all probably discovered a few practical, down-home, time-tested solutions to the frustrating little problems of everyday life. Why not share your best "horse sense" with the rest of MOTHER's readers? Send your suggestions to Down-Home Country Lore, THE MOTHER EARTH NEWS®, 105 Stoney Mountain Road, Hendersonville, North Carolina 28791. A one-year subscription—or a one-year extension of an existing subscription—will then be sent to each contributor whose tip is printed in this column.—MOTHER.

HOW TO CUT YOUR HOT WATER BILLS IN HALF! *

Amazing New THERMAR INSTANT, TANKLESS HEATERS Provide a NEVER-ENDING FLOW of Piping Hot Water!

The Dr. Chamberlin Family of New Jersey has Just Taken 10 Showers In a Row — *the 10th was as hot as the first . . . and they're saving 50% on their hot water bill too!*

SAVE MONEY • SAVE ENERGY

New from Thermar — a simple, automatic heater that makes hot water as you need it. The Thermar instant tankless can save you as much as 50% compared to an ordinary tank-type unit. Tank heaters cycle on and off 24 hours a day. Tests prove much of the energy they use is wasted — lost right through tank walls to heat empty cellar or attic spaces.

Thermar has eliminated the tank. The Thermar heater waits for your command — without wasting energy. Then, the moment you open a faucet, Thermar springs to life to provide all the hot water you need continuously. You'll never again run out of hot water. Pays for itself over and over again. Save money, save energy, enjoy better service too. Thermar products — famous for quality for over 50 years! Models for every use. Gas (LP or Natural) or electric. All U.L. Listed or AGA Certified.
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FAMILY OF SEVEN CUTS HOT WATER BILLS IN HALF!

Tankless Heater Provides Endless Hot Water

The Hughson family of Pennsylvania

The Hughson family just took 7 showers in a row — the 7th was as hot as the first —and they're saving hundreds on their hot water bills too.

Sound, Simple, Money-Saving Idea

Did you know that much of the energy used to heat your basement tank of water is dissipated right through the walls of the tank itself and into your storage or crawl space area?

The Perfect Answer-New Thermar™ Tankless Instant Hot Water Heaters

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The ordinary Tank-Type Hot Water Heater is the most "Energy Costly" appliance in your home. In this day of rising costs and energy consciousness, a new THERMAR™ TANKLESS INSTANT HEATER should be considered by everyone interested in saving money and saving energy.

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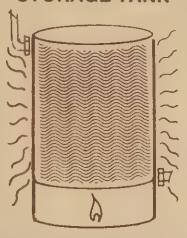	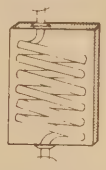
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The name may be a tongue twister, but an IPSWH is a snap to build, install, and use.

BUILD AN INTEGRAL PASSIVE SOLAR WATER HEATER

David Bainbridge

For the do-it-yourselfer searching for an inexpensive, easy-to-build solar water-heating system, the integral passive solar water heater (IPSWH, pronounced *ipswah*) is a dream come true. All you need to get going on this down-to-earth water warmer is a discarded electric water heater tank rescued from the local dump . . . a homemade plywood box to house it in . . . a can of flat black paint . . . a sheet or two of used window glass or clear plastic . . . a few common plumbing fittings . . . and some pipe and insulation. Combine all that with some spare hours of satisfying sawing, hammering, and wrench-turning, and you'll have an ongoing supply of hot water provided virtually free from that friendly furnace in the sky.

But before we get into the nitty-gritty of integral passive solar water heaters, let's run through a quick review of the basics of solar heating . . . for those who may be new recruits to this wonderful world of free energy.

We'll be discussing solar collection systems for heating purposes—*not* for charging photoelectric cells or for other power applications—and there are only two basic types: active and passive. The essential difference between them is the use of external power: While *active* solar heating systems employ fans or heat pumps to circulate the Btu they gather, *passive* setups don't. As their name defines them, integral passive solar water heaters work on the latter principle, and that lack of power dependency and resultant energy savings is one of the IPSWH's greatest selling points.

Passive solar heaters can be subdivided into two classes: units in which the functions of heat collection and storage are separate—known as *thermosiphon flat-plate* systems—and arrangements that combine collection and storage into one *integrated* unit . . . namely, integral passive solar water heaters.

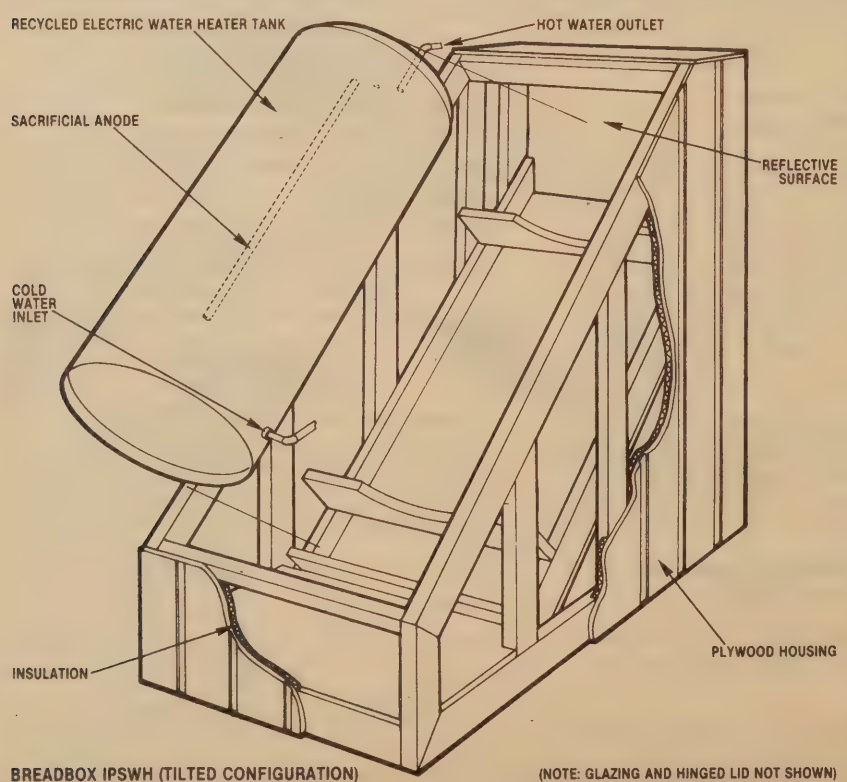
Since the flat-plate passive solar water heater is the predominant type in use today, most folks think of such collectors as being the *best* available for solar water heating. But in fact, for many uses—especially owner-built applications—IPSWH's outshine their flat-plate competition in almost every way . . . including ease and economy of installation, reliability, and higher resistance to freezing.

HOW IPSWH'S WORK

The design of all IPSWH's is based on a tank—or a *series* of tanks—painted flat black to absorb heat from the sun and then transfer the trapped Btu to the water stored within. IPSWH's are sometimes called *batch* heaters, because the heart of the system is the "batch" of water stored in the tank(s). To increase heat collection and reduce heat loss, a combination collection/storage tank is enclosed in an insulated box covered on the south-facing side and top with a glazing material . . . usually glass or molded plastic.

The standard IPSWH brings cold water into a solar collection tank through an inlet near the bottom (or through a *dip tube* that enters the tank at the top and discharges unheated water near the bottom), heats it, then moves it along to a backup heater—which can be powered by gas, electricity, or wood—through an outlet near the top. This system uses waterline pressure for circulation, eliminating the need for expensive pumps and/or controls. And during the summer months—or where it is warm and sunny year round—the backup heater can often be turned off or bypassed entirely, with the IPSWH providing for *all* of your hot water needs.

Incidentally, for those of you who may be looking for solar-related business opportunities, IPSWH's have excellent potential for mass marketing/installation in tract housing areas, plus a growing array of commercial applications.



BREADBOX IPSWH (TILTED CONFIGURATION) (NOTE: GLAZING AND HINGED LID NOT SHOWN)

MODEST BEGINNINGS, HOT RESULTS

Let's look now at the history and evolution of the IPSWH, and at five of the many designs that have proved effective and popular with home-based handypersons.

The principles used in modern IPSWH's are undoubtedly the same as those that were first applied to solar water heating. For example, Butch Cassidy's roost in Utah reportedly still bears remnants of a passive solar water warmer: a black can filled with water and placed in the sun to heat. Similar primitive IPSWH's are being used today in locations where people live without piped-in water and conventional energy sources such as gas and electricity.

The first *commercial* solar water heater, patented in 1891 by Clarence Kemp, was dubbed the Climax solar heater. Kemp's Climax used four cylindrical water tanks housed in a pine box lined with felt paper and covered with single-pane glass. This system typically was mounted on a roof, with cold water from a reservoir entering the first tank and passing through the other two in series, and with gravity carrying the heated liquid down to the tap. By the year 1900, more than 1,600 Climax units were in use in America, primarily in the sunny regions of California and Florida.

In 1898, Frank Walker of Pasadena, California applied for a patent on an improved IPSWH. Walker's model was recessed into the roof, instead of being exposed as were the Climax heaters. And more important, the Walker unit incorporated backup connections to a "wet-back" woodstove. Thus, the Walker model was the direct forerunner of today's most usual IPSWH application . . . a solar *preheater* feeding into a standard gas or electric water heater located inside the house.

But successful as these early IPSWH's proved to be, they were destined to gradually disappear as enticingly cheap natural gas became available and was aggressively promoted.

BUT THE HEAT GOES ON

Fortunately for us, the popularity of natural gas didn't bring solar water-heating research and development to a *total* standstill. In one valuable experiment conducted at the University of California at Berkeley in 1936, a researcher named F.A. Brooks tested several IPSWH designs and demonstrated that tank-type solar heaters were capable of producing water warmed to more than 120°F. He found, too, that upright tanks placed on an incline delivered hotter water than horizontally

situated units. Brooks also concluded that IPSWH's could produce hot water at a cost consistently below that of flat-plate systems. The only shortcoming of the IPSWH was lower early morning temperatures as a result of nighttime heat loss.

Contemporary investigators have reduced nighttime cool-down in several ways, the most effective involving the use of manual or automatic lids on the heater boxes. These hinged lids are raised during the day, their reflective undersides catching and directing additional solar Btu onto the tanks. At night, the insulated lids are closed to retain the stored heat. A second method of heat-saving relies on an ultramodern, specially coated metal foil, tagged "selective surface tape". This expensive—$75 to $80 for a 4′ X 8′ sheet!—but effective material offers a combination of high absorptance (on the average, about the same as flat black paint . . . approximately 95%) and low emissivity (thereby cutting heat loss).

FIVE HOT ONES

Let's take a look at five of the many types of integral passive solar water heaters in use today.

The *single-tank IPSWH* is often dubbed a "breadbox" heater . . . because it looks a lot like an oversized breadbox (see the illustration). Overall, it's probably the most economical and least complicated of the permanent IPSWH's to build, requiring only easily scrounged materials and basic construction skills.

For the "econo-model" breadbox unit, a standard electric water heater tank is painted flat black and housed in an insulated plywood box. Glass or another transparent glazing material covers the top and the south-facing side of the box. (Glass is generally the most suitable glazing for owner-built heaters.) And, while not always absolutely necessary, an additional hinged, insulated lid will reduce nighttime cool-down and increase the collector's efficiency.

Incoming water enters the breadbox near the bottom of the tank, with the sun-warmed water being drawn off from near the top and routed on to the backup unit inside the house. A horizontally oriented IPSWH provides the lowest heat gain, but is the easiest to build and is less visible than a vertical one. By using *tilted* tanks—which can be attained by vertically flat-mounting the unit on a pitched roof—the stratification of the water is increased and the solar angle is improved . . . resulting in higher temperatures.

The *vertical three-tank IPSWH* has as simple a design as the breadbox, but it's constructed on a larger scale. For the triple-tanker, three glass-lined electric water heater cores are painted flat black—or are covered with selective surface tape—and enclosed in a large, well-insulated box. Glass or other glazing material covers the south-facing side and the top of the box, and shuttering in the form of a lid or interior insulated "drapes" can be installed to improve heat retention. The three tanks are plumbed in series, with the protected central tank serving as the final stage before the heated water is discharged (see the photo).

Naturally—because of the greater collection surface area and improved thermal layering—the tilted position of the tanks and the series hookup provide better heating than is offered by the smaller, horizontal, single-tank breadbox. To test the efficiency of the three-tank IPSWH, I installed and monitored one for a full year at my home in north-central California . . . and found that it supplied an impressive 70% of my family's hot water!

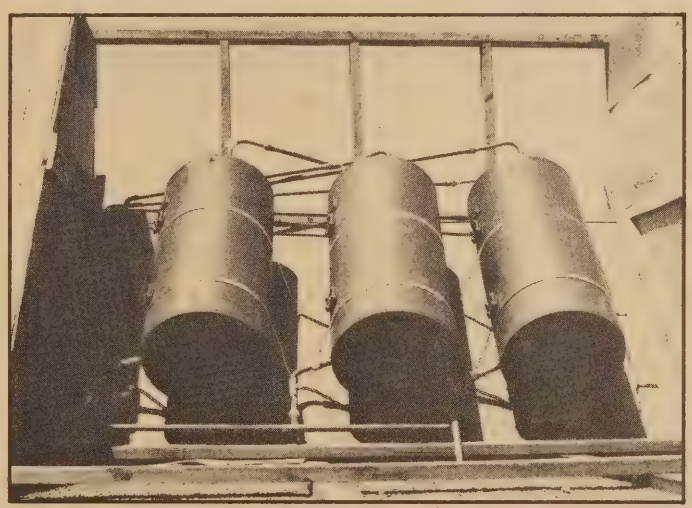
A *greenhouse IPSWH* installation is the ticket for best performance and freeze protection in colder climates or during the winter months. Of course, you can increase the cold-weather efficiency of your solar water heater by locating it in virtually *any* protected, warm, sunlit enclosure . . . but an attached solar greenhouse is usually the best choice. Almost any IPSWH configuration can be used inside the plant room, with size and weight being the primary limiting factors. Usually, the heater is tucked up under the peak of the greenhouse roof to take advantage of the warm, rising air. And as with all IPSWH's, the collector tank should be painted flat black or coated with selective surface tape. For maximum efficiency and cold-proofing, an insulated box with top and south-facing glazing, and a hinged, insulated, after-hours lid is still recommended.

The *inverted IPSWH* offers another good method of reducing heat loss in colder climates and seasons, and is especially effective protection against after-dark cool-down. Visualize, if you will, a standard IPSWH with a black tank enclosed in an insulated box with south-facing and top glazing . . . and the whole works flipped on its lid! Now, the insulated portions of the heater box are looking at the sky, thereby significantly reducing nighttime heat loss. Sunlight gets to the collector tank(s) by way of one or a series of reflectors. At first, these upended heaters seem almost absurd. But they've performed quite well at sites throughout the country.

A *low-cost IPSWH*, which can be built for just a couple of bucks, was developed a few years ago by the Minimum Cost Housing Group at McGill University in Canada. This unit offers more Btu per dollar than any solar water heater designed to date, and should be useful to summer campers and owners of weekend homes with no conventional water-heating facilities. This budget water warmer can be built with a minimum of time, effort, and cash by anyone in need of a little hot water for washing purposes, and requires only a plastic garbage bag, some PVC pipe and fittings, a few hand tools, and a lighted cigarette for "welding" the plastic joints.

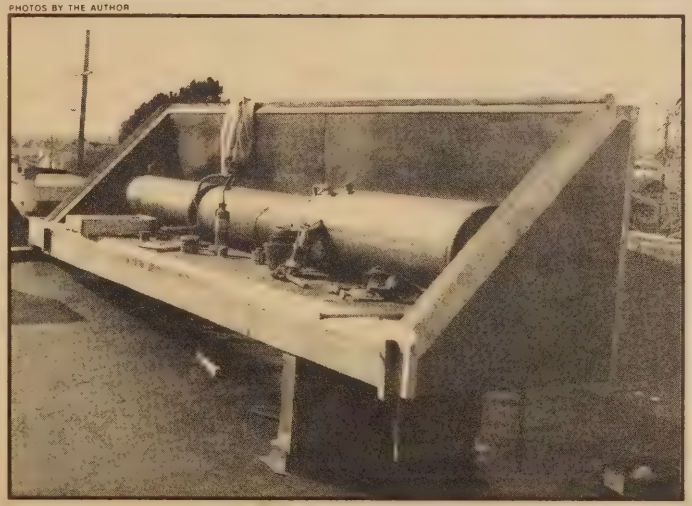
The heart of this heater is the common plastic garbage bag of 1.6-mil-thick, dark green polyethylene in a 26″ X 35″ size. The drain outlet is made of PVC pipe, washers, and nuts, and is fastened to the bag mechanically (that is, by tightening the fittings over a hole punched in the plastic). Tests at McGill University demonstrated that a plastic bag of this type and size is strong enough to hold water to a depth of three inches, thus

(continued on next page)



The author's "test-bed"—a tilted, three-tank IPSWH—provided his family with 70% of their total hot-water needs during a full year of monitoring.

PHOTOS BY THE AUTHOR



A horizontal, in-line, triple-tank IPSWH under construction.

(continued from preceding page)
offering a capacity of about a dozen gallons. Temperatures of about 104°F were reached by just setting the bag of water out in the sun, and when the bag was placed inside an insulated box with a glass cover, the water temperature rose to a respectable 132°F!

THE SIX COMMANDMENTS OF IPSWH DESIGN

A few basic principles and considerations govern the design, installation, use, and maintenance of IPSWH's. If your heater's specifications and installation follow the six commandments listed below, it will work admirably and will provide you and your family with inexpensive solar-warmed water . . . no matter *which* specific design you decide to go with.

[1] *Locate your heater for maximum sunlight exposure.* Find a sunny, south-facing location for your IPSWH, preferably close to the conventional gas, electric, or wood backup unit to minimize piping distance. You might have to indulge in a bit of calculating to be sure your solar collector will be exposed to the sun year round . . . but such an orientation is, after all, the single most important consideration.

[2] *Make the collector as effective as you can.* First, decide on the type of tank(s) you'll use for your heater. Tanks come in a wide variety of sizes and shapes, with most of them being usable. But long, thin cylinders are the most efficient (they have the greatest ratio of surface area to water volume), and by far the cheapest and easiest of these are used electric water heater cores.

If you prefer *new* tanks, out-of-the-carton, glass-lined electrical water heater cores—minus the heating element, outer insulation, and sheet metal cover—can be ordered from several manufacturers. But if you plan to retrieve your cylinders from cast-off electric units, be sure to test them thoroughly for leaks and rust, and patch carefully where necessary. *Never* use a tank that you have doubts about.

One of the most suspect parts of any used electric heater core is the "sacrificial anode", a rod made of metal that has a low resistance to corrosion and is inserted into the tank from the top to attract and absorb any corrosive elements in the water. Examine the anode, and replace it if substantial corrosion and/or consumption is evident. A new anode costs only a few bucks, and it will add measurably to the longevity of your system.

Next, determine *where* your IPSWH will be installed—roof, platform, wall, or ground—keeping in mind that a filled three-tank system tips the scales at a hefty 1,000 pounds or so. For most applications, it's best just to plop the heater right on the ground. This makes installation easier, eliminates the weight problem, and renders the manual raising and lowering of a night lid less of a chore. Finally, reflectors can be used to increase solar exposure . . . with a variety of materials being suitable for this purpose. (It's usually no problem to make a hinged lid serve double duty as a reflector when it's raised to its daytime position.)

[3] *Insure that your water tank(s) will retain heat.* There are a number of options for glazing the top and the south-facing wall of your IPSWH, including single- and double-paned tempered glass, Du Pont Tedlar-coated fiberglass exterior with Teflon-film interior glazing, acrylic or polycarbonate plastics, and R-3.6 Heat Mirror. In most cases, you should use *two* layers of your chosen glazing material with an air space between, to provide maximum heat retention. Be sure to caulk and tightly seal each of the panes.

[4] *Size your heater for its intended application.* To determine what size IPSWH you need, allow 30 gallons of water capacity per person in your household. Davis Alternative Technology Associates suggests about 2.5 gallons of water per square foot of glazing as the maximum ratio for good heating, and a smaller water-to-glazing ratio will speed up heat gain considerably. Using those figures, you can plan around a requirement of 30 gallons of water capacity *and* about 12 square feet of glazing per user. But if you can't meet these desired measurements, don't lose heart. Even a drastically undersized system will preheat water well above ground or ambient air temperature . . . thus providing economical solar water warming, which will conserve nonrenewable energy sources and save cash.

[5] *Make an efficient connection to the backup system.* Try to locate your IPSWH close to its conventional mate, thus minimizing the amount of connecting pipe required. To be sure the pipe is properly sealed and insulated, consider using Armaflex and a coating, or urethane foam with aluminum jacketing. (Although it can take up to 72 hours to freeze a standard exposed water heater tank at 12°F, pipes—because of their restricted size—are far more sensitive to cold.) Any exposed pipes in particularly cold places should also be heat-taped.

Before hooking your IPSWH to its backup unit, bleed the air out of the tank. You can bleed through the temperature/pressure valve (if you install such an overheating safety feature), or just leave a plug out at the top of the tank until the system is full of water. And as a final precaution when galvanized tank fittings are to be used with copper tubing, make sure that the two metals are separated with nonconducting, dielectric fittings to prevent accelerated corrosion. I've had very good luck using copper tubing, plastic dielectric connections, and galvanized fittings on my tanks.

[6] *Build your solar water heating system to last.* Use the best materials you can afford or scrounge, and take proper care in the construction of your unit. And be safe: Make sure that the tank supports are strong enough to bear the load they'll carry . . . and consider adding a tempering valve near the backup heater.

CONVENTIONAL WATER HEATER MAINTENANCE

Once in a while, someone will install a solar water preheater, while simultaneously neglecting his or her conventional gas or electric unit . . . with the results reflected in unnecessarily high water-heating bills, in spite of the solar preheater!

Four common forms of neglect are [1] exposing the conventional water heater to the cold by improperly insulating the room in which it is housed, [2] failing to insulate that tank sufficiently (inexpensive and easy-to-install "thermal blankets" can be added in just minutes), [3] maintaining an unnecessarily high temperature setting (which is sometimes the fault of a bad thermostat), and [4] allowing sediment to build up on the bottom of the tank and act as insulation between the water and the heat source.

Check your backup heater at the time you install your IPSWH. In fact, even if your solar unit is only a dream at the moment, it makes good energy sense to tune up your *conventional* water heater *right now.*

A BRIGHT FUTURE FOR SUN-POWERED HEATING

More research is needed to determine methods of increasing the effective solar collecting surface area of tanks, as well as to improve means of insulating for year-round operation in colder climates. Currently, *sheltered* integral passive solar water heaters can be cost-effective even in 6,000-degree-day climates. *[EDITOR'S NOTE: Active collector alternatives that provide definite freeze protection even in very cold regions include "drain-back" systems that empty out at night and heat-exchange units that employ an antifreeze solution in their exposed components.]* But as IPSWH technology stands today, it definitely offers the energy-conscious do-it-yourselfer an attractive alternative to costly hot water and conventional energy dependence . . . and presents the solar professional with a low-overhead, uncrowded field of action.

Of course, you don't have to take my word for it. Look around, read around, shop around, and—most important—*build* for yourself. I think you'll come to the same conclusion I did years ago . . . that integral passive solar water heaters provide the most economical, efficient, down-to-earth method of water warming under the sun.

EDITOR'S NOTE: Anyone seriously interested in delving into the world of IPSWH's should read David Bainbridge's The Integral Passive Solar Water Heater Book *($10.95 plus $1.50 for shipping and handling from The Passive Solar Institute, Dept. TMEN, P.O. Box 306, Bascom, Ohio 44809), from which portions of this article were taken. The book contains 99 pages of informative, copiously illustrated guidance in all aspects of IPSWH design and use.*

And for more of David's innovative, authoritative energy-saving ideas, check out his article "Build a Water-Wall Home" in MOTHER NO. 84 . . . and his The Second Passive Solar Catalog *($11.95 plus $1.50 shipping and handling from The Passive Solar Institute at the address given above).*

Another good sourcebook, Passive Solar Water Heaters: How to Design and Build a Batch System *by Daniel K. Reif (Brick House, $12.95), offers 208 pages of valuable passive solar building instruction. It's available from Mother's Bookshelf® (105 Stoney Mountain Road, Hendersonville, North Carolina 28791) for the price listed plus $1.25 for shipping and handling.*

If there is no solar equipment outlet in your locale (for goodies such as selective surface tape), you'll be glad to know that there are a number of mail-order houses . . . one of which is Solar Components Corporation, Dept. TMEN, P.O. Box 237, Manchester, New Hampshire 03105. The catalog costs $1.00, or you can call toll free at 800/258-3072.

For all you restless snowbound gardeners out there in MOTHERland, we've put together . . .

MOM'S 1984 SEED COMPANY "WISHBOOK" GUIDE

About the only way most ardent backyard cultivators manage to get through the mid-winter months—when last year's carefully tended rows or beds are, in most parts of North America, hidden two feet beneath an unbroken expanse of snow—is by curling up with a bunch of seed catalogs and dreaming about the coming spring's (usually, in the mind's eye at least, bigger and better) gardens.

So, to brighten your January and February, we've prepared a list of the major seed companies that supply catalogs. Write to any of the firms in the list below (don't forget to add the charge for postage if one is indicated), and you'll receive a veritable book of dreams. Then, once you've finished going through your catalog collection (*and* laying out the umpteenth possible plan for your 1984 garden), it'll be nigh onto planting time!

Alberta Nursery & Seeds, Ltd.
Dept. TMEN
Box 20
Bowden, Alberta
Canada T0M 0K0

Burgess Seed & Plant Company
Dept. TMEN
905 Four Seasons Road
Bloomington, Illinois 61702

Burpee Seed Company
Dept. TMEN
300 Park Avenue
Warminster, Pennsylvania 18974

D.V. Burrell Seed Company
Dept. TMEN
P.O. Box 150
Rocky Ford, Colorado 81067

De Giorgi Company, Inc.
Dept. TMEN
P.O. Box 413
Council Bluffs, Iowa 51502
(send $1.00 for postage)

Dessert Seeds
Dept. TMEN
Box 181
El Centro, California 92244

Epicure Seeds
Dept. TMEN
Box 23568
Rochester, New York 14692

Farmer Seed & Nursery
Dept. TMEN
818 Northwest 4th Street
Faribault, Minnesota 55021

Henry Field & Company
Dept. TMEN
407 Sycamore Street
Shenandoah, Iowa 51602

Fisher's Garden Store
Dept. TMEN
P.O. Box 236
Belgrade, Montana 59714

Gleckler's Seedsmen
Dept. TMEN
Metamora, Ohio 43540

Gurney Seed & Nursery
Dept. TMEN
Yankton, South Dakota 57079

Joseph Harris & Company
Dept. TMEN
3670 Buffalo Road
Moreton Farm
Rochester, New York 14624

H.G. Hastings & Company
Dept. TMEN
P.O. Box 4274
Atlanta, Georgia 30302

Herbst Brothers Seedsmen
Dept. TMEN
1000 North Main Street
Brewster, New York 10509

Jackson & Perkins
Dept. TMEN
Medford, Oregon 97501

Johnny's Selected Seeds
Dept. TMEN
Albion, Maine 04910
(please use postcard)

J.W. Jung Seed Company
Dept. TMEN
339 South High Street
Randolph, Wisconsin 53957

Laval Seeds
Dept. TMEN
3505 St. Martin West
Ville de Laval, Quebec
Canada H7T 1A2

Orol Ledden & Sons
Dept. TMEN
Box 7
Sewell, New Jersey 08080

Earl May Seeds & Nursery Company
Dept. TMEN
North Elm Street
Shenandoah, Iowa 51603

Mellinger's
Dept. TMEN
2310 West South Range Road
North Lima, Ohio 44452

Nichols Garden Nursery
Dept. TMEN
1190 North Pacific Highway
Albany, Oregon 97321

L.L. Olds Seed Company
Dept. TMEN
P.O. Box 7790
Madison, Wisconsin 53707

Ontario Seed Co., Ltd.
Dept. TMEN
P.O. Box 144
Waterloo, Ontario
Canada N2J 3Z9

Geo. W. Park Seed Company, Inc.
Dept. TMEN
Box 31
Greenwood, South Carolina 29647

Pinetree Garden Seed
Dept. TMEN
New Gloucester, Maine 04260

Porter & Sons Seedsmen
Dept. TMEN
Washington Avenue
Stephenville, Texas 76401

Seedway, Inc.
Dept. TMEN
P.O. Box 250
Hall, New York 14463

R.H. Shumway Seedsmen
Dept. TMEN
628 Cedar Street
Rockford, Illinois 61101

Stokes Seeds
Dept. TMEN
737 Main Street
Box 548
Buffalo, New York 14240

Thompson & Morgan
Dept. TMEN
P.O. Box 531
Pittston, Pennsylvania 18640

Otis Twilley Seed Company
Dept. TMEN
P.O. Box 65
Trevose, Pennsylvania 19047

Vermont Bean Seed Company
Dept. TMEN
Box 308
Bomoseen, Vermont 05732

Vesey's Seeds
Dept. TMEN
York, Prince Edward Island
Canada C0A 1P0

Wyatt-Quarles Seed Company
Dept. TMEN
P.O. Box 739
Garner, North Carolina 27529

Why fire up the gas or electric range when the trusty old woodburner is waiting—warm and

THREE DIFFERENT (AND DELI

Deborah Dunn

Over the past several winters, I've come up with quite a number of homegrown recipes designed especially for fixing on a wood heater. Three of them have become family favorites, and I'd like to share this trio of woodburner meal maps—one for each of the day's three repasts—with you. (Mind you, I prepare these dishes on my trusty old wood cookstove, but they can also be done up on the top of any well-fired box-type wood-*heating* stove . . . if you're willing to experiment until you hit upon the correct time-and-temperature combinations.)

These through-the-day meals are sure to delight the hungry mouths around *your* house, too. So slide that simmering teapot to the back of the stove, grab your ingredients, and let's get cooking!

FROSTY-MORNING PANCAKES

- 1-1/2 cups of whole wheat or unbleached flour
- 1/2 teaspoon of salt
- 2 teaspoons of baking soda
- 1 teaspoon of cinnamon
- 1-1/2 cups of milk or fruit juice
- 3 tablespoons of honey
- 2 eggs
- 1/4 cup of cooking oil
- 1 apple, peeled and chopped
- 3 tablespoons of sunflower seeds

In a mixing bowl, combine the flour, salt, baking soda, and cinnamon. Blend the milk or juice, honey, eggs, and oil in a separate container. Stir the wet and dry mixtures together, and add the chopped apple and the sunflower seeds.

Now, set a heavy skillet or griddle on a medium-hot stove top. When a drop of water will dance on the heated surface and then evaporate quickly, you're ready to start cooking. Coat the bottom of the pan or griddle with cooking oil, and pour in a large spoonful of your mix. Fry each cake until its edges are slightly dry and its top bubbles, then flip it over to cook the other side. (For best results, use a large spatula and turn the cakes only once.)

Serve your pancakes topped with butter and maple syrup . . . or make your own sweet sauce by adding hot water to a jar of homemade preserves until the concoction reaches a syruplike consistency.

LUNCHTIME HOT RICE SALAD

- 2 cups of water
- 3 tablespoons of tamari
- 1 bay leaf
- 3 tablespoons of butter
- 1 cup of brown rice
- 1 onion, chopped
- 1/2 green pepper, chopped
- 1/2 cup of chopped tomato
- Parmesan cheese

Bring the water to a boil. Add the tamari, bay leaf, 2 tablespoons of butter, and the rice. Let the seasoned mix boil vigorously for 5 minutes before moving it to a cooler place on the stove—or placing it on a trivet—to cook slowly for approximately 40 minutes. Just before the rice is done, sauté the chopped onion and pepper in a tablespoon of butter over medium heat until they become limp. Add the cooked vegetables and the chopped raw tomato to the rice . . . sprinkle individual portions with Parmesan cheese to suit your taste . . . and serve the dish with a bread of your choice.

CHINESE STIR-FRIED VEGETABLE DINNER

For this treat, you'll need to proportion the following ingredients to the number of servings you wish to prepare . . . about 1 to 2 cups per person, depending on the appetites around your house:

- carrots
- broccoli
- squash
- spring onions
- Spanish onions
- celery
- green pepper
- cauliflower
- mushrooms
- almonds
- green peas

Now, combine these spices, rubbing them with your fingers to blend them and bring out their flavors:

- 1/4 teaspoon of nutmeg
- 1/4 teaspoon of coriander
- 1/4 teaspoon of cardamon
- 1/4 teaspoon of ginger
- 1/2 teaspoon of sage
- 1/2 teaspoon of granulated garlic
- 1/2 teaspoon of basil
- 1/2 teaspoon of celery seed
- 1 teaspoon of cumin

Set the spices aside. Slice the vegetables, not including the peas, thinly and toss them gently. Next, chop the almonds lengthwise (you may also want to toast them in a hot oven for 10 minutes). Then precook the peas in a pot of water until they're just tender.

Once you've completed these preparatory steps, pour 1/4 cup of sesame or peanut oil per serving into a cast-iron skillet and place the pan on the stove. When the oil is good and hot (you'll know it's ready if an onion slice will start sizzling as soon as it's dropped in), add all the vegetables *except* the peas. Cook these fixings for 5 minutes, stirring constantly, and then sprinkle on the blended spices. (Start with a healthy pinch per serving, adding more as you like.)

When everything's cooked to your satisfaction, it's time to eat. Top each helping with a spoonful of almonds and cooked peas. You may also want to serve the meal with brown rice or noodles, and to put tamari or soy sauce on the table.

EDITOR'S NOTE: For an excellent guide to buying, installing, caring for, and using a wood cookstove—complete with scores of taste-tempting recipes—consider Jane Cooper's 208-page book, Woodstove Cookery: At Home on the Range. *You may order this guide from Garden Way Publishing Company (Dept. TMEN, Charlotte, Vermont 05445) by sending the firm $6.95, plus $1.00 to cover shipping and handling.*

And those of you who don't have a wood cookstove—but would like to take advantage of your airtight box stove for range-top winter cooking—may want to look into The Airtight Woodstove Cookbook *by Dale Darling and Julia Van Dyke (Brick House, $7.95). In addition to the impressive collection of mouth-watering stove-top recipes, this 128-pager includes directions for building your own stove-top oven. This book is available from Mother's Bookshelf®, 105 Stoney Mountain Road, Hendersonville, North Carolina 28791 . . . for the list price plus $1.25 shipping and handling.*

STAFF PHOTO

ready—to serve your wintertime cooking needs?

CIOUS!) WOODSTOVE RECIPES

'Tis the time to forage through seed catalogs and choose next season's vegetable and flower varieties. That's why we thought you'd enjoy seeing . . .

MOM'S (GARDENERS') FAVORITES

[1] Dwarf Siberian kale . . . [2] Cayenne peppers . . . [3] Utah celery . . . [4] Ruby lettuce . . . [5] Lamb's ear . . . [6] Rudbeckia . . . [7] Sensation cosmos . . . [8] Hybrid Rocket Mixed snapdragon.

STAFF PHOTOS

Now every gardener who's ever nurtured a vegetable from seed to supper table has his or her particularly preferred variety of the crop . . . and each one of us who's raised flowers has some special tried-and-true standbys that get grown anew every year. It's no wonder, then, that one of the great pleasures of gardening is telling others about those "pet" cultivars.

And that's just what we're going to do right now: tell you which flowers and vegetables Kerry and Barbara Sullivan, the couple who tended our gorgeous Eco-Village gardens the past four years, have learned to cherish most. Mind you, while the following list inevitably displays a good bit of personal bias, it also contains the distillation of a great deal of experience. The Sullivans have frequently grown as many as eight varieties of a single crop in one year, carefully monitoring each type's performance and selecting only the best cultivars for the following year's garden. Any plant, then, that's made it to their lineup of favorites has *earned* the privilege . . . and may well merit a trial planting in your own backyard or homestead plot.

Naturally, though, Barb and Kerry have been most interested in choosing cultivars that do best in one specific site: the mountainous, 4,400-degree-day climate (Zone 7) of our Ecological Research Center in western North Carolina. So the fact that Ithaca MI lettuce or Fiesta Gitana calendula have done well in our environs doesn't necessarily mean they'll thrive in *your* locale.

But you'll never know that for certain unless you pick some of the crops that sound most appealing to you and try them out, will you? Fortunately, such horticultural experimentation is another of the great joys of gardening. So shop around for some new ideas in the following charts. (Almost all of the plants mentioned are available from several of the companies listed on pages 61 and 95. Where only one or two houses carry a particular variety, its source or sources may be found in the "Comments" section of the chart.) Then send off for a few seed catalogs, order your plant starters, and get ready to make 1984 your best growing year yet!

VEGETABLES

VEGETABLE	VARIETY	COMMENTS
BUSH BEANS	Provider	Very reliable, tasty, and high-yielding.
FAVA (OR BROAD) BEANS		Planted—as early as peas—in future tomato bed. Used to fix nitrogen and to help disinfect soil for the upcoming tomato crop.
POLE BEANS	Kentucky Wonder	Highly prolific. Tastes better than any bush bean.
BEETS	(Early Wonder) Tall Top	Yields good tops and roots. Reliable and early.
	Formanova	An easy-to-grow, cylindrical beet.
BROCCOLI	Bravo	An excellent germinator and strong grower. (Stokes or Johnny's)
CABBAGE	Darkri Hybrid	Produces a small head, but matures early and offers good taste. (Park)
	Early Jersey Wakefield	An easy-to-grow, pointy-headed standard variety.
CARROTS	Kinko 4"	The sweetest-tasting carrot we've found. Matures early. (Johnny's)
	Nantes Fancy	A good all-around, easy-to-grow carrot. (Johnny's)
CAULIFLOWER	Dominant LD	A strong, late-maturing variety.
	Self-Blanche	You don't have to wrap the leaves of this one!
	Snow Crown Hybrid	An All-America Award winner.
CELERY	Utah	Quite reliable. We've had no disease or bug trouble with this one.
CORN	Golden Bantam	A dependable standard variety.
CUCUMBERS	Marketmore 80	The best and most disease-resistant cucumber we've found. Good for pickling or for eating. (Johnny's)
GARLIC	Silver Skin	A garlic's garlic. Offers excellent taste in good-sized cloves. (Nichols)
JICAMA		A big root crop that needs a long season (we start ours indoors in March) and tastes like water chestnuts.
KALE	Dwarf (Siberian)	A good compact variety. Not as curly as some, so it's easy to wash.
LETTUCE	Buttercrunch	A good "old standard".
	Ruby	A beautiful red lettuce that's flavorful and tolerates heat well.
	Ithaca MI	The easiest to grow—and best-tasting—head lettuce we've raised.
ONIONS	Wonder of Pompeii or Eclipse	Excellent for greens or as pearl onions.
	Granex 33	A sweet "Vidalia" onion. (Hastings)
	Yellow Globe Danvers	The one we grow for storage.
PARSNIPS	Hollow Crown	Our best producer.
PEAS	Sugar Bon	The quality's not as good as Sugar Snap's, but it comes in super-early.
	Sugar Snap	The best edible pod pea. Don't pick it until the pod is filled out.
	Wando	Our favorite shelling pea. Heat-tolerant and high-yielding.
PEPPER	Anaheim TMR 23	Mildly hot, good for stuffing. Our choice for using in chilis rellenos.
	Cayenne Long Red	Our best little hot one.
	Yolo Wonder	A fine, reliable bell pepper.
POTATO	Kennebec	A good-tasting, easy-to-grow storage potato.
	Red Pontiac	Great for an early crop.
PUMPKIN	Connecticut Field	A care-free, huge pumpkin that's good for meat, seeds, or jack-o'-lanterns.
RADISHES	Pontvil	Cylindrical, with excellent flavor. It makes for a nice break from all those little red globes. (Thompson & Morgan)
	Daikon Tokinashi	A versatile, all-seasons daikon type. (Nichols)
SPINACH	Bloomsdale Longstanding	A good standard variety.
SUMMER SQUASH	Yellow Crookneck	Our choice for the summer crop. (Johnny's or Herbst)
SWEET POTATOES	Puerto Rico	A meaty, buttery bush potato that doesn't sprawl too much.
SWISS CHARD	Fordhook Giant	The most reliable chard we've found.
TOMATO	Whopper	The most disease-resistant kind we know of (an important feature in our blight-prone locale). Whoppers are big and offer good—but not exquisite—taste. (Park)
	Roma VF	The best paste tomato we've grown.
TURNIP	Purple Top White Globe	An easy-to-grow standard. We save and use the seed.
WINTER SQUASH	Waltham Butternut	A classic beauty that's relatively easy to grow.

FLOWERS

FLOWER	VARIETY	COMMENTS
ACROCLINIUM (Sunray or Everlasting)	Best Mixed	Annual. A small, bushy, long-stemmed flower that makes a most enjoyable everlasting bouquet.
ARMERIA (Thrift or Sea Pink)		Perennial. A compact, grasslike plant with clover-type blossoms. Good cut or dried.
CALENDULA	Fiesta Gitana	Annual. Yields lots of small flowers.
	Pacific Beauty Mixed	Annual. Early and tall. A good cut flower that also attracts beneficial insects.
CLEOME (Spider Flower)	Mixed Colors	Annual. Pretty, tall, self-sowing, and good for edging.
COLUMBINE	McKana Giants	Perennial. An unusual flower (it looks like a falling star) that's sure to be the talk of the neighborhood.
COSMOS	Sensation	Annual. Extremely easy to grow. Offers long-lasting color.
DELPHINIUM	Connecticut Yankees	Perennial. A light blue to purple long-lasting cut flower. Delphinium blooms early and long, but it's not easy to grow, being fungus-prone and often needing to be staked.
ECHINACEA (Purple Coneflower)		Perennial. A striking beauty that resembles a giant purple daisy.
HOLLYHOCK		Annual. A tall flower that's enjoyed by hummingbirds and is useful in marking off garden plots or as a backdrop for shorter plants.
ICELAND POPPY	Summer Promise	Perennial. An early-blooming and unusually long-lasting poppy. We haven't had any luck direct-sowing them, though, so we start ours in flats indoors and transplant. (Park)
LARKSPUR	Giant Imperial Mixed	Annual. This self-sowing flower (good cut) is supposed to deter flea beetles.
LOBELIA	Blue Stone (Compacta)	Annual. Easy to grow. Lobelia produces nice little mounds of intense blue. (Park)
NEMOPHILA (Baby Blue Eyes)	Insignis Blue	Annual. A small, low-growing, quick-blooming, and beautiful blue flower.
NICOTIANA (Flowering Tobacco)	Sweet-Scented Sensation Mixed	Annual. A very sweet evening-scented bloom that helps make late work in the garden pleasant.
RUDBECKIA (Gloriosa Daisy)	Marmalade	Perennial (but we treat it as an annual). An easy-to-grow, long-blooming dwarf cut flower.
SALPIGLOSSIS (Velvet Flower)	Dwarf Friendship Mixture	Annual. Temperamental and poisonous, but amazingly beautiful. Displays astonishing patterns in its tubular throat. (Park)
SNAPDRAGON	Hybrid Rocket Mixed	Perennial, grown as an annual. Exquisite and very dependable.
STACHYS (Lamb's Ear)		Perennial. An unusual, eye-catching plant with gray green woolly leaves and lavender flowers (which honeybees love).
STATICE SINUATA	Grandstand Mixture	Annual. An unusual-looking bloom that's a "must" for dry flower arrangements.
STOCK	Evening Scented	Annual. Lilac-colored, not very good-looking, but it gives off a surprisingly strong, delightful fragrance in the evening. (Park)
	Trysomic Giant Imperial Blend	Annual. A sweet-smelling cut flower. (Park)
STRAWFLOWER	Helichrysum Monstrosum Mixed	Annual. The easiest to grow, most widely used dry strawflower.
SWEET PEA	Royal Family Mixture	Annual. A lovely, long-stemmed cut flower with charming fragrance and lots of color. (Park)
TITHONIA (Mexican Sunflower)	Torch	A tall plant (up to six feet) with an orange flower. It makes a nice border plant. Bumblebees and hummingbirds favor it.
VALERIAN (Garden Heliotrope)		Perennial. An herb grown for making our own Biodynamic Preparation 507 (used in compost). The root attracts earthworms.

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His writings have been used in numerous style and content workshops and accredited courses at such institutions as California State University, UCLA, Fordham, University of Illinois and Worcester Polytechnic Institute.

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2. Do the only sensible thing. Send me the ten bux and get started on wearing in that path to the bank.

P.S. One more thing (say, this Du Vall is a windy so and so, isn't he!). There are lots of people right now in bad financial straits. I hope you're not one of them, but if you are, having read this ad you now have absolutely no excuse for being broke, because as the saying goes, "This is it!" This could truly be the once-and-for-all solution to any money miseries you have. I guess you'll have to take my word for it until you receive these fabulous reports — but if it eases your mind any, over 1,000,000 men and women worldwide have been, over the years **repeat buyers** of my books, courses, reports, cassette tape programs and newsletters. There must be a reason . . .

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THE EARTH SYSTEMS KIT HOUSE

How about a ferro-cement subsurface dome that's also economical?

Financing, contract labor, and raw materials costs have taken their toll of the American own-your-own-home dream in recent years. At the same time, in an effort to seek a new, energy-saving route indoors, many people are now considering housing alternatives that once were shunned by society's mainstream.

Unfortunately, "more efficient" doesn't always mean "less expensive". Take earth-sheltered housing, for example. A decade ago, few folks had ever heard of it, and even fewer understood its advantages. Today, though, soil-covered structures number in the thousands and appear in a variety of styles and sizes. Even so, these subterraneans share one common drawback: All of them must be specifically engineered to withstand the pressures that their earthen blankets invariably subject them to . . . and in many instances, this has required the services of a professional architect and the use of some downright *serious* structural components.

Well, that may be within the reach of folks who have husky financial resources, but shoestring budgets aren't designed to handle that kind of load. There's no easy way around the dilemma, either. Regional and local building codes universally demand approved engineering on earth-bermed construction for the protection of the residents-to-be . . . effectively quashing any do-it-yourself shortcuts contemplated by the greenback-strapped owner.

Situations such as this beg for solutions, and we've recently heard of an ingenious one you might want to look into: A firm by the name of Earth Systems, Inc. markets a *pre-engineered* structure that they sell in *kit* form! This package differs in at least four ways from the other prefab homes currently available. First of all, it's truly an earth-sheltered design and thus incorporates all the advantages inherent in that kind of building. Second, it's in the shape of a hemispherical dome, which offers an excellent strength-to-material ratio *and* is free-standing, with no internal supports. Third, the structure is composed of an integral steel framing network covered with a shell of concrete (this monolithic construction eliminates problem seams and joints). And finally, you can purchase the kit shipped complete from the factory, or—if local purchasing of some materials seems more attractive—you can send for part of it and supplement the rest at the building site.

Earth Systems offers an oval dome and a half-dome (open end) structure, as well as the "true" dome shape . . . and their standard kit comes in four sizes with diameters of from 30 to 52 feet. The form is established with a frame of lightweight bolted-together steel beams to which is attached a network of 1/2" reinforcing bar to create a grid of 12" squares. Then a fabric-and-wire panel is fastened to this skeleton, and a 4"-thick covering of concrete—shot from a pressurized gun—is applied to the surface of the structure, with additional material being supplemented at the base. Once that's set, insulation and waterproofing can be added to the outside, and—after a sufficient curing period—the excavation can be backfilled and the house can be covered.

When compared with conventional stud-frame construction, this technique offers a considerable savings in hourly labor costs. In fact, it's possible to completely close in a 1,950-square-foot dome—on an unexcavated site—in a week's time . . . a process that more than likely would take a carpentry crew three times that long!

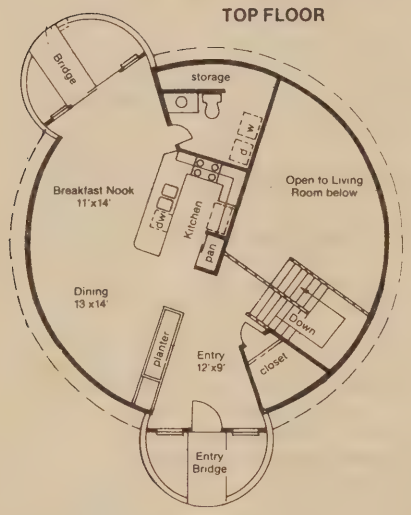
Because of the shape of the structures, most Earth Systems homes are designed and built as two-story units. The grade-level entry is on the second floor, where (typically) the kitchen, dining area, and family room are situated. A circular stairway offers access to the belowground level, which features a vaulted living room and standard ceilings in the bedrooms and bathrooms. Each of the subterranean rooms has an atrium that provides natural illumination, ventilation, and emergency egress, and an aboveground cupola at the top of the dome admits additional daylight and outside air as desired.

Ordinarily, only the lower half of the dome is actually below grade, while the upper portion is bermed with earth to a depth of two feet or so. But Earth Systems' structural engineer states that the entire building has been designed to accommodate *full* embedment if need be, because the framework is stressed for just about any type of construction site that can be imagined. The dome's spherical shape helps to distribute weight evenly over its surface. Loads on the upper part of the shell are compressive and translate into tensional forces at the base. There, the footing serves both as a foundation and as a stabilizing ring to keep "stretching" pressures in check.

The basic kits—which include the structural beams, their anchors, the necessary supports for the second floor, the rebar, the fasteners, and the forming material—cost between $10,500 and $15,000, depending on the size of the house. Obviously, by the time the structure is finished inside and out, the total bill will come to considerably more than that figure . . . but the owner-builder can tackle a great portion of the labor, thus appreciably cutting those costs. Also, conventional financing has been approved for these designs. Indeed, the Earth Systems folks indicate that none of their structures has ever been denied a building permit, though their houses have been constructed in a number of states from coast to coast.

Spherical, subterranean, and economical . . . that may sound like an unusual combination. But it might just be the solution if you're going to build on a "pay as you go" schedule . . . particularly if you'll have to squeeze in your carpentry around the old nine-to-five haul.

EDITOR'S NOTE: A free color brochure describing the Earth Systems kits in more detail is available from Earth Systems, Inc., Dept. TMEN, P.O. Box 3270, Durango, Colorado 81301.



40-ft. dome
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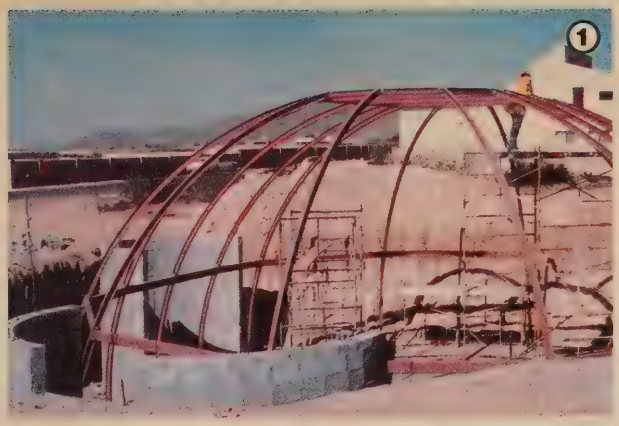
PHOTOS BY FRANK GOETZ, MICHAEL MUCH, DALE PEARCEY, AND GENE PEARCEY



[1] A typical kit dome's structural members are bolted together on top of a preformed slab . . . [2] covered with a network of rebar and reinforced fabric, and "shot" with concrete . . . [3] then—after a reasonable drying time—"layered" with insulation, waterproofing, and backfilled earth. [4] The dome home's interior has an open feeling because it needs no internal supports. [5] This Arizona earth shelter looks almost conventional! [6] An open-ended dome under construction.

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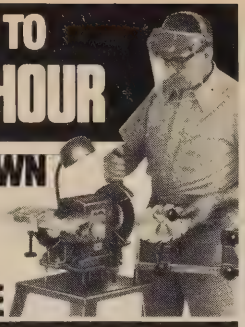

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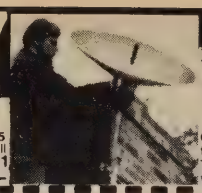

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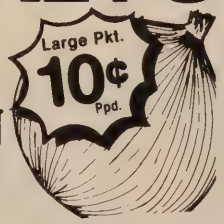

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REPORT FROM:

BACK TO THE LAND... AND BACK AGAIN

Cathy Johnson

Leaving Dandelion Farm was one of the most painful things my husband "Sleepy" and I have ever done. Like other MOTHER folk, we'd dreamed for years about owning a little piece of the good life. We even practiced for the big move by foraging for wild foods in vacant fields, and by gardening on our tiny city lot . . . interspersing green beans with the roses and planting squash in the ornamental rock garden. But mostly, we just planned, and saved, and dreamed, and talked . . . and planned some more.

When we finally found our land and made the big move, it was as if the elusive dream had come true: There it was, Dandelion Farm, nestled into a bend of a pretty little creek, waiting for us at the end of a quarter mile of winding drive. It was *so* beautiful!

Well, we put the next seven years into building that particular castle in the sky, and when we finally had to admit that we were beaten, we felt totally lost. We didn't know where to go from there, and we couldn't imagine who we'd be when we *got* to wherever it was we'd go. Our identities were so bound up in our self-image as back-to-the-landers, living in gentle harmony with the earth, that leaving was a real emotional blow. Besides—we had to admit it—we had *failed*.

Why? Well, *age*, for one thing . . . Sleepy and I were not youngsters. Coping with a perpetually cold, 140-year-old house—with no indoor plumbing—was another reason. Most of all, though, it was probably inexperience combined with two years of incredibly harsh summer droughts and winter storms that finally did us in.

Sounds like a sad story, doesn't it? We *were* sad, believe me. But we didn't give up. My mate and I decided to find the best life we could, no matter *where* we were. And as it has turned out, we've found that good life in a small Victorian house in the little town of Excelsior Springs, Missouri. In fact, we began turning the place into our *new* dream the day we moved in.

Right away, I fell in love with the three old plum trees in the backyard and the vestiges of rhubarb showing along the north fence . . . someone else had once used this place to try to live close to the land. My husband and I tilled the soil in half of the backyard and claimed it as our garden space. By using raised growing beds and intensive gardening, we got an amazing yield from our tiny 15′ X 20′ plot the first year: beans, peas, onions, tomatoes, cabbage, broccoli, kohlrabi, squash, beets, lettuce, radishes, and whatever else we felt like experimenting with.

Then, three years ago, my interest in herbs outgrew the space we'd allotted them, and we began digging up the yard again. A curving herb bed now connects the garden to the side yard and overflows with sage, catnip, lemon balm, gray santolina, lavender, and mint. The comfrey has its own space outside the garden, and anything we don't *grow*, we can get by swapping with neighbors or foraging for in the nearby park.

Ah, the park . . . the free-growing blackberries we find there give us all the jellies and syrups we need, and the wild greens and morels add even more variety to our menu. (OK, so maybe we don't "own" the native edibles we pick, as we did on the farm. But does anyone ever really *own* nature's gardens?)

And we've made significant strides toward self-sufficiency *inside* our home, too. I've fashioned homemade solar energy storers by filling black-painted plastic milk jugs with water and placing them in the south-facing windows. And last year, instead of installing *clear* plastic on the inside of the one southern portal that isn't protected with a storm window, I used *black* plastic with a small vent hole cut at the top . . . surprisingly, that simple setup turned out to be an efficient, *super*-inexpensive heat grabber!

Still experimenting, I found that pop-in plastic-foam shutters help cut nighttime heat loss and are easy to store in the daytime. Insulated curtains made from old quilts also help keep the evening chill outside, while we insulate ourselves by snuggling under a homemade comforter.

For a long time, we debated the practicality of buying a ceiling fan for the living room . . . Sleepy lost his job in April of 1982, and money gets a good squeeze around here before we let it get away. When we finally purchased the air mover, though, we soon realized we'd made the right decision. With our high Victorian ceilings, the fan is a lifesaver on hot summer days. And in winter—set on low speed—it blows warm air from the stove into every room of the house. (The folks who designed and built these turn-of-the-century Victorian houses were no dummies: The high ceilings make it possible to store a lot of heat, and the connecting doors between all the rooms promote efficient circulation.)

This fall we finally installed our antique woodstove . . . an investment we'll never regret. Now, the gas furnace goes on only well after midnight, and we keep it at a low enough setting that it runs very little. Our vintage stove *does* burn more wood than a modern, airtight heater, but with the doors open it converts into a cheery fireplace, and the oven directly over the firebox turns out a procession of rolls, pies, toasted cheese sandwiches, and even stews. The top also has lids like a cookstove, so—all in all—our old beauty adds a surprising amount to our independence.

Growing toward self-sufficiency is an organic thing, and, as such, takes time. Our plans often seem to take shape slowly, but the changes are steady and positive. Natural gas prices have more than doubled in the last two years, and electrical costs have jumped as well, but we've kept pace and even *lowered* our monthly bills.

Did we lose our identities when we left Dandelion Farm? Did we "fail" as we were convinced we had at the time? Now, I can see that while Sleepy and I may not be farmers, living close to nature doesn't have to mean owning 20 acres and using an outhouse. Here in town, we still grow our own food and heat with wood. My clothes still dry in the fresh air and smell sunny. Certainly, the wildlife on the farm was delightful, but we've had a fox, raccoons, and possums visit us right here on our little Victorian homestead. We also feed hundreds of birds, and share our garden with beneficial toads and ladybugs. The deer come to drink in the park only two blocks away, and an old Tom turkey and five of his lady friends cross the road not three blocks from our house. And to top off the wildlife scene, a great blue heron fishes in a nearby creek and takes flight majestically on its seven-foot wingspan at our approach.

PHOTO BY THE AUTHOR

"Sleepy" works the soil on the Johnson family's urban homestead.

We may have failed as farmers—and perhaps as bona fide back-to-the-landers—but I think we're two of the happiest "failures" you're ever likely to meet. No sir, if I were asked to give advice today about buying a farm, I'd say, "Great idea! Do it if you have the youth, strength . . . and money. If not, look around at the possibilities right where you *are*."

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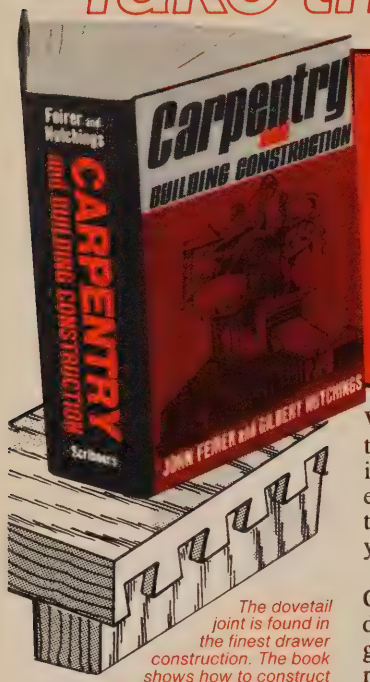

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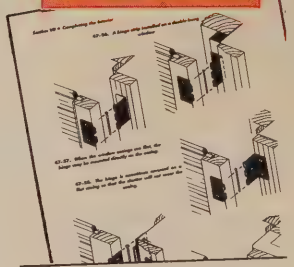

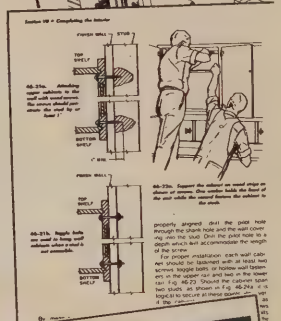

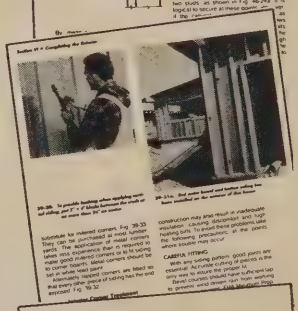

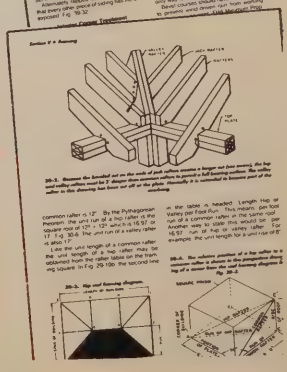

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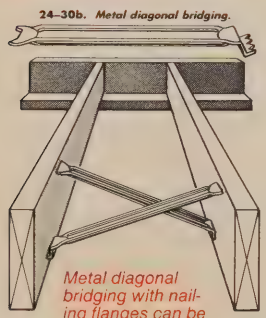

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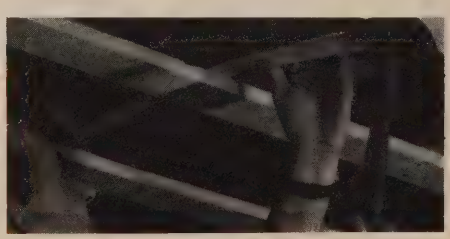

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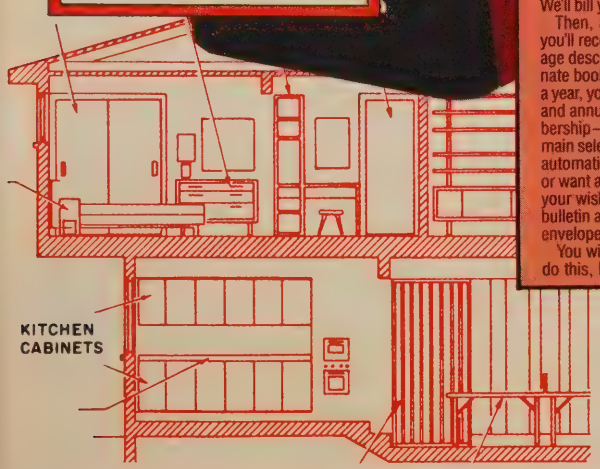

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The cow's in labor . . . nothing's coming out . . . and you can't reach the vet. Now what?

LIVESTOCK PARTURITION: DEALING WITH HOMESTEAD DELIVERIES

Randy Kidd (and MOTHER's staff)

One of the most exciting times in any homesteader's year is the day the animal babies come. Unfortunately, if something goes wrong and a creature is lost during parturition, one's elation quickly turns to sorrow. True, birthing mishaps are rare (in her infinite wisdom, Mother Nature very seldom slips up in such matters) . . . but they *do* occur. If you're a small-scale livestock breeder, then, you need to be informed about and prepared for the big event. That way, you'll know what's going on during parturition, so you can determine *if* and *when* your critter needs help.

Mind you, if you're an inexperienced birth attendant, any emergency assistance you offer should consist of one simple step: *Call the vet!* I do not recommend taking on unfaced obstetrical difficulties yourself unless you have to. Still, one day you just might be in a situation where you can't reach the vet . . . in which case the fate of the mother and baby may rest solely in your —and the good Lord's—hands.

Now I don't presume to be able to unfurl all the mysteries of birth to you in one article. But at least I can give you a basic idea of what to expect when things are going well in the "labor room" and what to do about them when they're not. For simplicity's sake, I'm only going to deal here with the common long-legged, hoofed beasts (cows, goats, sheep, and horses), since these animals generally deliver their young, singly or in pairs, in pretty much the same manner.

PREPPING

No matter how much you read about animal birthings, firsthand observation and experience are ultimately going to prove to be your best sources of information on the subject. For this reason, I recommend that —if you're new to livestock midwifery—you [1] get out and observe the births of some of your neighbors' animals, [2] make certain someone with lots of critter know-how is by your side during the first few birthing days of your own stock, and [3] alert your vet to the pregnant animal's due date, and have the doc's number always at hand in case you need help for the baby's debut.

As the critical time nears, you'll want to make up a large labor room with plenty of fresh bedding, clean water, and tempting feed for Mama. Naturally, creating such a space doesn't guarantee that the mother's going to *use* it (as the accompanying sidebar illustrates!), so you might want to pen her up a few days before she's due. This practice will provide the mother-to-be with a bit of luxury and will enable you to keep an eye on her, in the event that she gives birth early. Check on her several times a day, from an unobtrusive location (a hayloft or another stall) where you won't disturb her.

NORMAL PARTURITION

OK, you've done everything you can to prepare for the event, and suddenly Mama shows definite signs of approaching delivery: She acts irritable, loses her appetite, paces about with an air of anticipation, constantly looks back at her swollen belly . . . or *all* of the above. And, when you look closely at the area around her birth canal, you see that the muscles have become very relaxed and almost jellylike.

Yep, chances are good that Junior is on the way! What do you do now? At first . . . *nothing*. Just relax and let nature take its course. Remember, most births happen without a hitch. And if you're overanxious, Mama could get jittery too, which might *create* problems. So stay calm.

Once the mother's water has broken, you should see the first signs of life poking through the birth canal. If everything's going normally, the baby's front hooves will appear first, followed by its head . . . which will be tucked down between its knees (see Fig. 1). The youngster will seem to be *diving* into the world.

Of the animals mentioned, the horse is the most efficient at delivering (with about a 95% success rate), usually producing its young within approximately 15 minutes after the water breaks. Because equines are so quick about parturition (and because they tend to give birth during the night, when it's quiet), it's fairly rare to observe a foal-

STAFF PHOTO

ing. On the other hand, cows, goats, and sheep are a lot slower about delivering their offspring, usually taking an hour for the process . . . and sometimes as many as two. Be patient with such a "slow" Mama as she strains: As long as you can detect continuous progress (no matter how plodding), you can assume that all is well. Also, don't be too alarmed if the birthing mother is pretty nonchalant about the whole business. It's not uncommon for a mare or cow to lie down . . . start giving birth . . . calmly stand up with Baby half in and half out . . . munch some hay . . . and *finally* (when good and ready) push Junior on out the rest of the way!

Most times, the process will go smoothly. All that's left for *you* to do is to paint the baby's navel with a potent iodine solution, make sure the youngster gets a good dose of colostrum (the mother's first vitamin-rich milk) . . . and burn or otherwise dispose of the afterbirth. With horses, this is usually expelled within an hour after delivery. With other animals, it can take as long as 12 hours after parturition.

ABNORMAL PARTURITION

Your best barometer for determining if and when the mother animal needs help is *time.* Say you've got a mare that's been in hard labor for 20 minutes without producing any visible results. Well, you know that it should take her only around 15 minutes to produce a foal, right? Therefore, you can assume that you've probably got trouble on your hands. Likewise, a cow, goat, or sheep that's not beginning to deliver after an hour or so of straining may well need assistance. *In no case should you leave an expectant animal in labor without help for more than three hours!*

As I said before, your veterinarian is the preferred obstetrician in time of trouble. But if—for whatever reason—a doc isn't available, you're going to have to take charge. Just take a deep breath, stay calm, and move *slowly* and *carefully*: A nervous nurse only makes things worse. First, find an assistant to hold the struggling mother for you. Then scrub up (that includes hands and *arms*!), and also wash off the area around the animal's birth canal to insure that everything is as sanitary as possible.

Next, lubricate your hands and arms with mineral oil or petroleum jelly, and gradually slide an arm through the animal's vulva to feel about, so that you can estimate what you're dealing with. You may have to wait until the mother relaxes her contractions, but be patient: She will, and pretty soon you'll be in touch with the fetus. Now, you'll have to figure out what you've got hold of by visualizing what the youngster looks like as you feel it.

Of course, most of us can tell the difference between a head and a rump, but you're more likely to encounter a leg before you come upon a face or a tail. To find out whether you've found a front or a back hoof, slide your hand up the limb you've got hold of until you get to the two leg joints. If both joints bend in the *same* direction, you've got a front leg. If they bend in *opposite* directions, you've got a hind one. In either case, reach all the way up the leg and find its mate to ascertain that both are attached to the same animal: It could be twins, you know!

Many births are held up by a front leg that's bent backward (see Fig. 2). This situation is fairly simple to correct. Just flex the shoulder, elbow, and knee joints of the tardy leg and slowly rotate the limb until it's alongside Baby's head and aimed forward. Should both legs be tucked (as in Fig. 3), bring one forward in the described manner and then the other, making certain to tuck the head down between them in the diving position when you're done. *[EDITOR'S NOTE: Some folks prefer to use a rope or obstetrical chain to reposition a slippery youngster in the womb. However, unless you really know what you're doing with these devices, you could wind up doing more damage than good. For instance, it's not uncommon to pull a hoof off with a badly placed, too-tight rope.]*

Another possible difficulty is that the baby's head may be bent backward (see Fig. 4). Solving this problem can be fairly tricky, so be very careful. In order to bring the head forward, you may have to push the baby *away* from the birth canal and *toward* the front of the uterus. To do this, wait until the mother relaxes her contractions before gently pushing against the youngster's chest. Then carefully pull the head down and forward, finally securing it between the forelegs.

Besides "molding" the soon-to-be-born offspring into the diving position, you may actually have to help the exhausted mother give birth. If so, get a good grip on the baby and—following the mother's contractions—pull down when she strains and ease up when she relaxes. Notice that I said pull *down* . . . not *out*! (That's because the birth canal points in a downward direction.) Be patient, taking all your cues from the mother, no matter how slow she is. The baby has enough problems without your yanking it about unnecessarily.

BREECH BIRTHS

Breech births—backward entries into the world—are pretty common . . . and are also fairly dangerous if you don't know what to watch out for (see Figs. 5 and 6). The main problem with this back-feet-first delivery is that sometimes Baby doesn't get enough oxygen. Naturally, as long as the youngster's attached to an untangled umbilical cord, it'll be fine. And don't worry: Most of the time, the cord won't snap or snag until the new arrival is well onto the ground. However, since the animal's head comes out after practically everything else, its nostrils have more opportunity to get clogged with mucus and afterbirth. Therefore, what you *do* need to worry about is making sure that you clean off the newborn's face and nose as soon as you can. (You may also want to give the young'un a good breath-stimulating rubdown as an added precaution.) In a breech birth, make certain that Baby's hind legs are straight out behind it prior to delivery. If they're not, apply the same techniques you'd use with front legs to get them in a good womb-exiting position.

(continued on next page)

FIG. 1
NORMAL PARTURITION

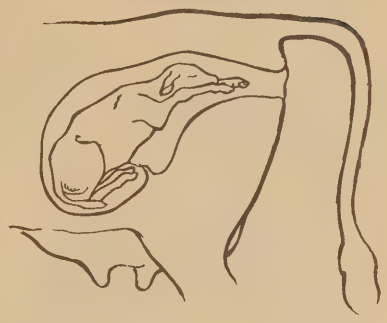


FIG. 2
LEG BENT BACK

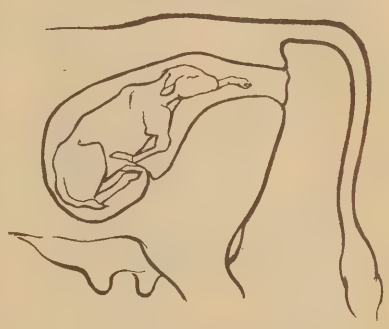


FIG. 3
BOTH LEGS BENT BACK

FIG. 4
HEAD BENT BACK

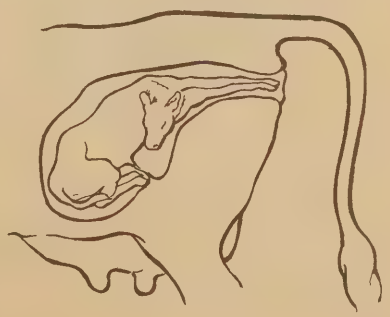


FIG. 5
BREECH BIRTH

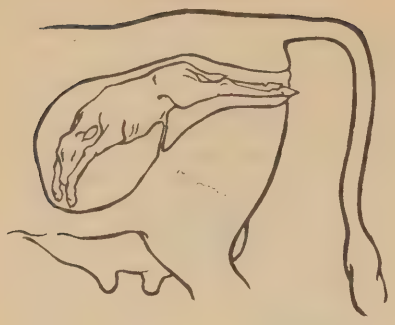


FIG. 6
BREECH BIRTH WITH HIND LEGS BENT BACK

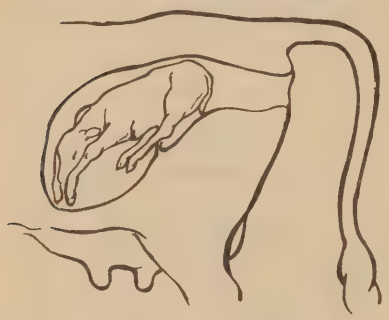
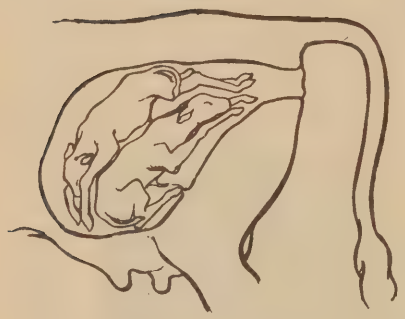


FIG. 7
TWINS



(continued from preceding page)

TWINS

I won't say much about double packages (see Fig. 7), because the problems involved are pretty much the same as those in solo births. Actually, since twins are generally smaller than singles, they're much easier to work with if you do need to intervene . . . but you should work on only one baby at a time.

FINISHING TOUCHES

The vast majority of times, of course, you'll "walk through" a birth-assist, and—almost before you know it—a lovely youngster will be looking up wonderingly at you. Don't forget to paint the newborn's navel with iodine, and see to it that the baby gets a big gulp of colostrum. Dispose of the afterbirth, too. *[EDITOR'S NOTE: If a mare doesn't expel the afterbirth within six hours after delivery, you'd better call the vet. The same holds true if a cow, sheep, or goat hasn't gotten rid of it after 24 hours.]*

After an abnormal parturition, the mother may be too worn out to tend to her little one, so you may have to clean the baby off—all over—for her. Afterward, give the new family a clean bed of straw or shavings to lie on, and provide a tempting laxative of bran and/or coarse hay for the mother.

Once you're sure they're comfortable and well taken care of, you can amble on back to the house for a nice cup of tea to calm your nerves, or you can do as I do: Settle down on a bale of hay and watch the first life-exploring antics of the brand-new creature you've just helped bring into the world.

EDITOR'S NOTE: Here are some sources of general information on methods of livestock care that would-be animal midwives may find helpful: The Family Cow *by Dirk van Loon (Garden Way, $8.95),* Backyard Livestock *by Steven Thomas (Countryman Press, $7.95),* Raising Milk Goats the Modern Way *by Jerry Belanger (Garden Way, $5.95),* Raising Sheep the Modern Way *by Paula Simmons (Garden Way, $7.95), and* Raising Goats: The Backyard Dairy Alternative *by David B. Weems (Tab, $12.95).*

All of these books are available—for the listed price plus $1.25 shipping and handling for one or two books, $2.00 for three or more—from Mother's Bookshelf®, 105 Stoney Mountain Road, Hendersonville, North Carolina 28791.

". . . I was soaked with sweat, slush, and manure, and my arm was permanently bent into some sort of fatigue rigor."

ONE OF MY FAVORITE BIRTHING YARNS

Thinking about proper locations for livestock birthing reminds me of one of the last "barn calls" I made before deciding that there's just got *to be an easier way to make a living than by being a veterinarian.*

A client phoned me around midnight once, saying, "Doc, I just got done watching the late show and walked over to the barn to see how everything was, and—what do you know?—I've got a cow down calving, and she's in trouble!" (Frankly, I've never been able to understand how these dairy folks can milk at 5:00 AM and still be able to stay up long enough to catch the late show!)

Well, when I got to the barn where poor Ma Cow was trying to give birth, I saw right away that she hadn't read the book on where to have her offspring. Instead of walking through the open barn door to get to her cozy, clean, and well-bedded delivery stall, she'd simply plopped herself down just outside the door . . . in a soft pile of steaming, knee-deep manure! To top that off, it was springtime in Ohio, and the heavens couldn't decide whether to let loose rain or snow, so they'd compromised on pouring down slush.

Keeping right in the spirit of things, Cow wouldn't budge, no matter how much I cussed and cajoled. So to get the calf out, I had to wade in smelly, suck-your-boots-off muck, working solely by feel . . . because my flashlight batteries had died and the farmer couldn't locate either his flashlight or fresh batteries. To add to my misery, the only place I could operate was in the precise spot where a steady stream of slush from the gutterless barn roof poured straight down the back of my neck. Meanwhile, the farmer offered me unsolicited advice from under the shelter of the eaves.

After about an hour of struggling and straining (without the aid of an obstetrical chain, which—like the extra flashlight batteries—I'd neglected to bring along), I finally wrestled out a huge calf. Whew! No wonder *Mama had had so much trouble! At this point I was soaked with sweat, slush, and manure, and my arm was permanently bent into some sort of fatigue rigor. (Heck, my fingers weren't even going to be able to hold a pen to write out my bill!)*

Just then, I saw the farmer (still beneath the eaves) light up his pipe and heard him say softly, "Doggone, Doc, I'm sure glad we don't have two *of those to do tonight!"*

"We?" I thought, deciding that—just because in vet school they told us to always double-check (and because it would look good to the farmer)—I'd better stick my arm back into the cow one last time.

Yep, you guessed it. There was another calf in there (Lord knows how *it fit), and it was nearly as big as the first! To make a long story short, "we" finished pulling out the second calf just as the sky in the east began to lighten up. And—wouldn't you know it?—the minute we'd dried off the second youngster and painted its navel with iodine, Mama hopped up and walked straight to the warmest, cleanest corner of the barn, with her two calves merrily hobbling after her.*

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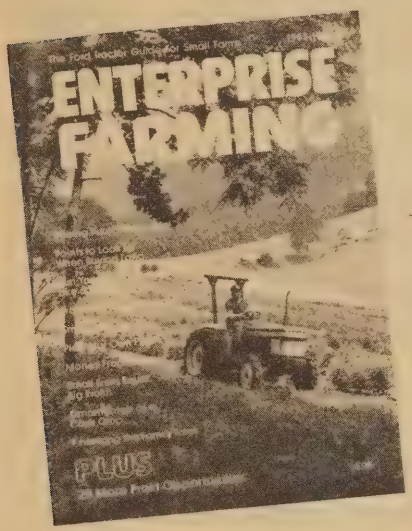

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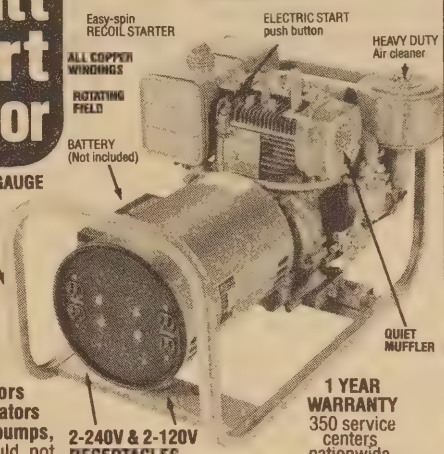

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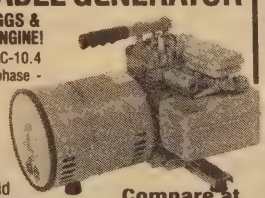

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Egg your hens on to higher wintertime production by feeding them nutritious home-sprouted forage.

MORE EGGS IN WINTER

James DeKorne

A little one-column article called "Animal Forage" that appeared back in MOTHER NO. 43 (page 82) told how to use hydroponically sprouted greens to increase wintertime egg production in chilly chickens. We tried it here in New Mexico, and it worked . . . *dramatically*. By experimenting with the method over the past three years, we've developed our own variation on forage sprouting, and I'd like to tell you about it.

We start our sprouts in heavy aluminum foil trays of the sort you find in most discount stores . . . you know, the four-for-a-buck kind (the original MOTHER method employed shallow aluminum cake pans). For extra stiffness, we nest two trays together and then punch nail holes in the bottoms to insure good drainage.

We've sprouted mostly barley seeds (partly because we favor their sprouts for our own salads), but the cluckers really go for oat and rye shoots, too. No matter what you choose, just pour enough seed into the tray to line the bottom to a depth of about half an inch. Once you've got the correct measure for your pans, transfer the entire batch into a large jar for the first stage of growth. Run water into the container until the seed is completely covered, then stash the jar in a warm, dark place—*sans* lid—for a couple of days. (We've had excellent results *without* adding nutrients to the water.)

After about 48 hours, give the seed a thorough rinsing in its container, then pour the whole amount back into the tray, covering it with a moist cloth. Rinse the seed twice a day so that it doesn't get a chance to dry out (and, consequently, *die*). Except for this cleansing, leave the little forage factory alone: The sprouts will grow faster if undisturbed.

When the greens have reached a height of about half an inch, remove the cloth and place the tray next to a sunny window during the day. But since sprouts need to be at about room temperature for optimum growth, you'll want to take them away from the window at night to a warm spot . . . maybe near a stove or heater.

When you've got what looks like a miniature forest on your hands (we let the plants get about five inches tall), it's dinnertime! You *can* feed your flock directly from the sprouting pans, but we stretch our supply—and save our pans from getting torn up—by yanking out a patch of greens each day. If you start a new batch of seed every few days, you'll have a continuous supply of wintertime forage for your feathered egg-factories.

Our hens really go for the "taste of springtime" on those snowy, overcast days in January and February. It's almost as if they're *grateful*, and they work extra hard to produce as many eggs in winter as they do in June and July. Winter forage sprouting is fun, inexpensive, and darned rewarding in breakfast omelets . . . so give it a go!

Here are some more hints:

MOTHER'S CHICKEN TIPS

No, "Chicken Tips" isn't some fancy recipe for sautéed broilers . . . but it is a recipe, of sorts. In going through MOTHER's back issues to see what words of winter-egg-production wisdom had been offered to and by MOM's readers, we realized just how much of a concern low off-season production is for many "egg growers" living in the chillier climes of the country . . . and *how many good hints had been sent in over the years to combat the problem.*

So we gathered a few of the best "oldies" and strung them together in the form of MOTHER's Chicken Tips. Let us know how they work for you . . . or if you have any time-tested methods of your own to share.

TOASTED SHELLS: A treat hens love to eat!
Reverend Larry D. Jones, Lyndon, Kansas

Most folks have heard about feeding eggshells to their original owners as an excellent source of vital nutrients, especially calcium. But for added crispness—which makes it easier to grind the shells into a form the "girls" can eat—I toast *the empty omelet housings. My layers just love these browned treats.*

To make them, I use a microwave oven set on high, for about 8 minutes . . . but a standard gas, electric, or wood oven—or even a skillet over low heat on a range top—works as well. Just experiment until you hit on the right time/temperature combination. I serve the hens their toasted treats first thing in the morning, about 15 minutes before they get their usual feed of grain. With this recycling method, my layers have been giving 100% production year round.

BLEACH THAT WATER for healthier winter layers.
James DeKorne, El Rito, New Mexico

Homesteaders I know who water their chickens from an open container during the colder months (to help keep the liquid from freezing) say that a capful of bleach per 2 gallons of water will purify it effectively. Chickens are messy critters, and this technique helps keep their drinking water from becoming a medium for disease-causing organisms. Also, more drinking water means more eggs! (Once freezing weather is over, it's best to return to using a covered container.)

CARNIVOROUS CACKLERS just love to lay!
"Carl", Durango, Colorado

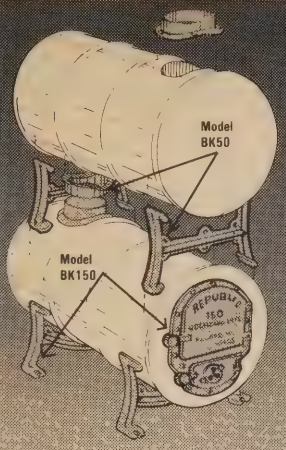
To stimulate my hens to lay in cold weather (and it gets plenty cold here!), I've had excellent results by giving them warm drinking water, and feeding them meat and fat scraps. Especially good is the "dust" from a meat saw. Any large supermarket with a meat-cutting department has plenty of these bonemeal-rich leavings. Some stores charge a small amount for the shavings, and some give the stuff away . . . but in either case, it's less expensive than high-protein commercial feed, and it nets the same results. This diet raises the body temperature of the hens, which helps put them back into production.

EN-LIGHTENED HENS make better layers.
Kathleen Gordinier, Walworth, New York

One of the best tricks I've found to up the output of my hens in winter is to increase the hours of light they receive each day. When that season rolls around and the days grow short, I use an overhead bulb to extend the "daylight" to 14 hours.

I've got a few other health- and production-promoting tricks in my bag, too . . . such as mixing in 1/4 cup of homemade apple cider vinegar with each gallon of water I give my poultry. The added acid, it seems, aids in balancing the layers' body chemicals.

Moreover, I let my chickens wander in and out of the barn (except during blizzards, of course), so they have plenty of opportunity to scratch. And just in case that's not enough exercise for the birds, I tie a few pieces of stale bread together with a string and hang it above their heads . . . a trick that's sure to keep them jumping. These silly-sounding things must be working, because in all the time we've had homestead fowl, we've never lost a chicken or had to go without eggs!



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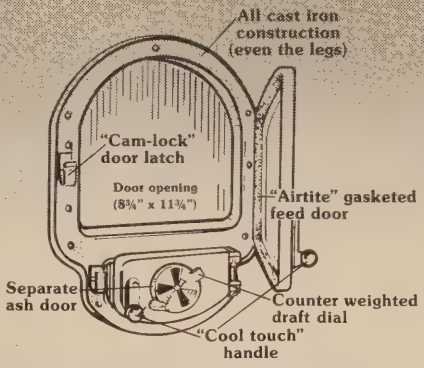
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Everett J. Castro

"Come on, boys, and let's go down,/Let's catch a whistle-pig in the groun'."
(from the folk song "Groundhog")

HAPPY GROUNDHOG DAY!

Come February 2, while the wind outside blows cold and sends swirls of snow skittering across the frozen Massachusetts landscape, my family, friends, and I will be basking in the sheer *anticipation* of warm spring breezes . . . and merrily celebrating a grand holiday with song, good cheer, and a sumptuous feast.

"February 2! Why, there's nothing special about that date . . . it's only Groundhog Day," you may say.

Yes, that's *exactly* what it is. But what to many folks marks just another wintry 24 hours, or—at the most—a peek at Pennsylvania's famed Punxsutawney Phil on the evening news, is to me and mine a festive occasion. As Pete Seeger's recording of the old Appalachian folk tune "Groundhog" sets the mood, we honor the day—a portent of spring—and the messenger who heralds it by having Old Mister Woodchuck himself to dinner . . . usually in the form of a delicious meat pie. This observance has become as traditional to us as having turkey on Thanksgiving and roast goose on Christmas.

In fact, we begin preparing for the day's festivities months in advance. We *have* to, since otherwise the guest of honor would be in hibernation during the five months preceding the Great Day, and—like as not—would sleep right through the party!

A LATE SLEEPER

As nearly everyone knows, popular tradition holds that the wily groundhog emerges from its burrow on February 2. In my neck of the woods (coastal Massachusetts), however, Mother Nature generally tells a different story. Chucks usually appear in late March or early April (the very earliest I've seen them up and about was one especially mild week at the *end* of February). The males come out first, and they have spring lovemaking—not the weather or shadows—on their minds. Kits, in litters of four or five, are born during April and May.

Although naturalists and outdoor photographers tend to look fondly upon the forager, most growers use every means at their disposal, from fence to force, to keep the mammalian "nuisance" off their premises. A few individuals, however—including myself—maintain a third perspective on *Marmota monax*: We cherish this specimen of our native fauna as a gastronomic treat.

Now I realize that many people get the queasies at the thought of sitting down to a plateful of woodchuck stew. But the simple fact is, groundhogs are eminently edible and delicious. Like rabbits and squirrels (both of which are valued food animals), whistle-pigs are vegetarians. Thus, their meat, when properly prepared, is quite tasty and tender.

HUNTING

Perhaps because they're so widely considered a "pest" animal, woodchucks are fair game throughout the year in most parts of the U.S. Some states do have specific seasons and/or other regulations that apply to hunting the varmints, however, so be sure to check with your fish and game department or local warden before you go afield. And in any case, keep in mind that the little chucklings are totally dependent on their mother for *at least* six weeks. For that reason, I make it a practice (and I hope you will, too) of waiting until mid- to late summer—after the young have left the natal den and are able to fend for themselves—before hunting the critters.

PHOTO SUPPLIED BY THE AUTHOR

Groundhogs are fairly easy to trap: Green beans and cut apples are both favored baits that produce good results. I've also successfully used ripe bananas to live-trap chucks during late summer.

A somewhat tougher challenge faces the sharpshooting hunter, who must sneak up on the keen-eyed, sharp-eared quarry. Small-caliber rifles (for instance, a .22 rimfire loaded with high-speed hollow-point bullets) or any of the more modern flat-trajectory "varmint" calibers—such as a .222 magnum, .22-250, or .225—are suitable for taking groundhogs. The best times for stalking *monax* are during the animal's usual feeding periods of early morning and just before sunset, but chucks can also be found sunning themselves at the entrances to their burrows (they seldom roam far from their homes) during almost any daylight hour when the weather's warm and sunny.

While hunting in local hay- and cornfields, often in temperatures of 90°F or more, I keep a large picnic-style cooler in the bed of my pickup. Immediately upon bagging a chuck, I gut it and place it in the iced box. You wouldn't want to eat a T-bone steak that had been left in a hot hayfield for an hour, and exposed wild game doesn't fare any better. So remember . . . get that meal-to-be on ice right away!

As soon as I get back home, I skin and cut up the chucks into usable pieces, carefully removing any fat and glands. *[EDITOR'S NOTE: Woodchucks, as well as most other small food animals such as rabbit, raccoon, and opossum, have scent glands that should be excised as soon as possible to avoid tainting the meat. When gutting or dressing groundhogs, look for—and cautiously extract* intact—*these small gray or reddish brown kernels of fat located under the forelegs, on top of the shoulder blades, along the spine in the small of the back, and around the anus.]* I then wrap and freeze whatever meat we won't consume within the next few days. Chucks taken in August and September and frozen immediately will keep long enough for our annual festivities on February 2. (Incidentally, if I've bagged any old, gristly 'hogs, I reserve them to be used as bait for winter fox-trapping. And since the hide on woodchucks is exceedingly tough, some people also scrape and tan the skin to make a useful, durable leather.)

RECIPES

You can use woodchuck meat in virtually any recipe calling for small game and in many other dishes as well. My favorites, though, are pie (our traditional Groundhog Day fare) and stew. Here are the directions for making both.

WOODCHUCK PIE

1 woodchuck
3 medium carrots
3 potatoes
1/4 cup of butter or margarine
1 onion, diced
2 tablespoons of flour
piecrust dough

Quarter the woodchuck and place the pieces in a large pot with enough cold water to cover the meat. Boil it for 10 minutes, then *discard the water*, refill the pan, and bring the liquid to a boil again. Lower the heat and let the contents simmer for about 1 to 1-1/2 hours. Add the carrots and potatoes and continue cooking the stew for about another 30 minutes . . . until the meat is tender and separates easily from the bone. By this time, you should be able to pierce the vegetables readily with a fork.

Now, strain the liquid and reserve 2 cups. The remaining pot liquor can be saved for soup stock, or discarded.

Next, remove the cooked meat from the bones and cut it into bite-sized pieces. Melt the butter or margarine in a large, heavy skillet, add the diced onion, and cook it for 5 minutes. Then add the flour and stir the mixture until it bubbles . . . put in the reserved liquid and blend the brew some more until it thickens . . . and, when that happens, combine the vegetables and meat, mixing the whole concoction thoroughly.

Finally, butter a large casserole and pour in the meat-and-vegetable mixture. Lay piecrust dough over the top of the filling, brush the pastry with milk, and place the container in a preheated 400°F oven for about 30 minutes, or until the crust has turned golden brown.

WOODCHUCK STEW

Prepare the meat and vegetables in the same way prescribed for woodchuck pie, but strain and reserve *all* the liquid—instead of just 2 cups—and put it into a clean pot. Then remove the meat from the bones and cut it, as well as the potatoes and carrots, into bite-sized pieces. Add the chunks to the pot liquor and bring the stew to a full boil. That's it! If you like, you can also add dumpling batter to the broth in spoonfuls, cover the pot tightly, and cook the tasty meal for an additional 12 minutes.

Try either recipe yourself, and you'll find out why February 2 holds a fond place in my family's hearts . . . *and* stomachs!

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Building with

NATIVE STONE

A complete guide to constructing a mortarless stone wall.

John Vivian

My introduction to stonework, like beginnings in so many homesteading skills, came unexpectedly, urgently, and at the wrong time. It was a rare clear morning during a rainy spring in the late 60's, and I was leaving for work from the once-derelict farm in upper Bucks County, Pennsylvania that provided my weekend refuge from a city job. The buildings on the place were 150-plus years old and had yard-thick stone walls. The house was stuccoed on the outside and was in fair shape, but the barn had been badly neglected. Its leaky roof rested on ten-foot-high walls that were originally constructed as a sandwich: vertical rock faces of rounded fieldstone on the outside with a mud-mortar/rubble stone mix on the inside. Most of the "pointing" (mortar troweled into the cracks between rocks to retard weathering out of the interior) was long gone. Winter rain or snow meltwater had run in, frozen, and gradually worked that mortar out, and the interior mud packing had gradually followed suit, until—in places—you could see clear through the walls. Still, the rock itself had been laid up well enough to stand through generations of rain and storm.

Till that day, that is. On walking to the car, I found that the thunderstorms that had kept me awake half the night had also washed out the southwest corner of the barn, along with half of each adjoining wall. Now, the roof was kind of fluttering in the wind . . . ready to follow the south wall downhill.

I hastily shored up the roof with old framing timbers, traded my Brooks Brothers/Florsheim city uniform for honest Sears/Endicott Johnson, and ordered up a few days' vacation from work. Then, when the Yellow Pages failed to produce any stonemasons at all (and the only general masonry contractor who'd talk to me recommended that we tear the walls down and let him put up a building-code-acceptable concrete-block foundation), I set about

teaching myself stonemasonry the only way I could, by studying the barn foundation itself: walls that had been built shortly after the American Revolution by dirt farmers with no architecture degrees, no building codes, no engines to ease the strain—just common sense and hands-on experience, simple ramps, levers and pulleys, a team of draft animals to pull the stone boat, and strong backs unafraid of work.

My slow-learner's repair job took the better part of a week, and most sections were built and torn down and rebuilt several times before I got them *half* right. But I can honestly say that the sense of satisfaction I felt on finally completing that barn wall did more than any other single experience to move me out of the urban rat race and into a life of self-dependence on the land.

First Lessons

I'd suggest that what I did for lack of any alternative—study an existing wall and copy it—is the best way for folks to learn stone building on their own hook. Granted, as with most anything, a master of the trade can teach you faster (some would say *better*), and I've learned a lot from proper masons. However, stone building is a highly individual skill, so once you have the basics down, you simply have to put in time working with the stone to develop your own style.

You see, no two builders will turn the same wall out of the same pile of rock. A mortared brick wall—all plumb and square and lovely—is a work of craftsmanship, to be sure. But it's a solid chunk of ceramic, assembled from identical component parts, and constructed pretty much like any other. A stone wall, on the other hand, is a combination of learned craft and an individual's intuitive response to a complex three-dimensional puzzle having an infinite number and variety of solutions. A stone wall is a work of art in the truest sense, my friend, a creation of order out of chaos, of beauty from dross—as much an improvement on nature as may be accomplished by the hand of man.

And damn, but it is satisfying! A hard-won satisfaction, to be sure; rock weighs a lot, goes up hard, and comes down harder. First of all, then, let's talk about how to keep that stone from denting you up too much as it moves in either direction.

Forewarned

Get yourself a pair of horsehide gloves, a well-fitting pair of hard-toed, high-topped boots, and stout, long-legged trousers. Rock is abrasive and heavy, and building walls with it is a totally engrossing task that tempts you to forget safety. With proper outer wear, you can avoid the scratches and dents—and ignore the occasional rolling stone—that otherwise can mess up both your hide and your concentration. Instep and toes are the body parts most at hazard, so proper boots are particularly important: They let you put a foot anywhere that best leverage demands without worrying about getting laid up.

Probably your most valuable piece of equipment is a healthy back. Know the old adage "Lift with your legs, not your back"? Well, you can just about forget it in wall building. Instead, don't lift *any* rock at all that's bigger than you can heft easily sitting down. Roll it, slip it, slide it, or flip it over end to end. Use ramps or levers or sleds. And when you must use brute force, get behind and push with your legs: Bending double at the waist and heaving up on a heavy rock is an invitation to a month of forced bed rest.

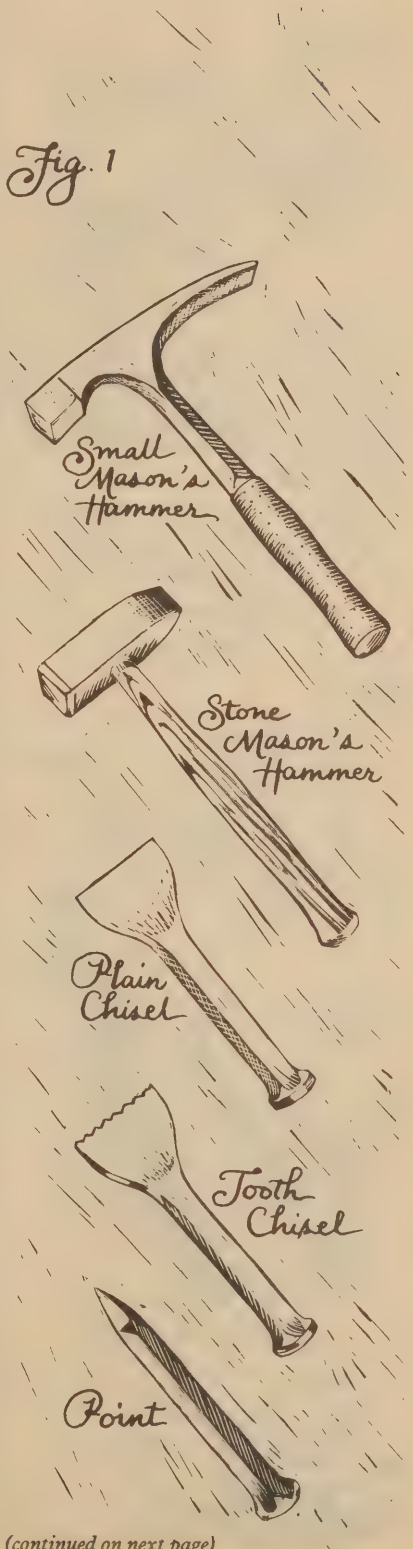
Oh, yes: Start off easy. Anyone in average good health can work rock. But you'll probably be employing muscles that haven't been used much before. So go slow at first, particularly if (like me) you find the urge to raise stone walls comes on at the first warm spring day following a muscle-softening winter. Chances are, your rock has rested where you first found it for upwards of 20,000 years minimum and is in no hurry to move. Don't rush it. The stones won't mind, and your back might.

Helpful, but not essential, are a set of rock-working tools like those shown in Fig. 1. You can find the common—and most useful—heavy mallets and brickmason's chisels at any country hardware store, or in mail-order or wholesale catalogs under "Trowel Trades" or "Mason's Supplies". Locating the big pry, star drills, railroad spikes, and other tools you'd need for any do-it-yourself quarrying may take a little searching. I'm told there are pointed quarrier's sledges and such niceties as wedge-and-shim splitting tools available, too, but I've never used them. If you really want to get into shaping stone, visit your local burial-monument works for advice and tool sources. And be sure to wear a long-sleeved shirt and use safety goggles during any hammer-and-chisel work. Rock chips can be sharper than a surgical scalpel, and they fly off the work at considerable speed.

Reading the Rock

Most of what I've read about stone building presumes a good supply of *table rock* (soft sedimentary rock such as shale, sandstone, or perhaps a nice smooth-grained limestone that was originally laid down as sheets of alluvial silt, sand, or tiny seashells at the bottom of ancient seas). Many such pieces retain their granular structure and multilayered sedimentation pattern and can consequently be easily worked into shape. (Some can be split up as even and square as brick with little more than a hand ax!) If you are so fortunate as to have access to good-building sedimentary stone, God bless.

On my own Berkshire mountain plateau, there's a mix of the other two—less malleable—major rock types: igneous and metamorphic. Interspersed all too liberally through the garden loam are fieldstones . . . called *cobbles* or *hardheads* by local folk and *glacial erratics* by



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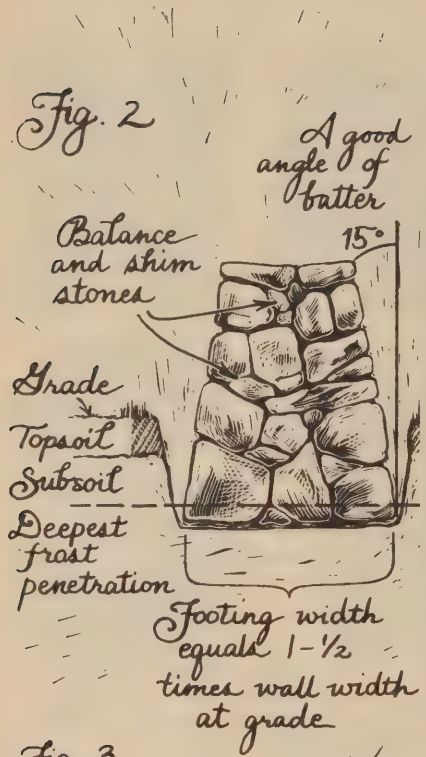

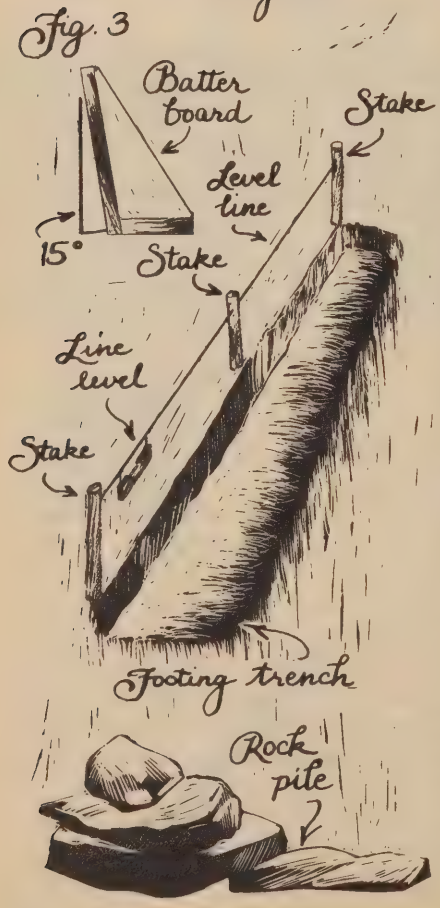

geologists. The more or less round hunks of igneous rock were formed of minerals that melted deep in the earth's innards, cooled to become crystalline rock such as granite or feldspar, and in time broke off and rolled down to us under the Pleistocene glaciers. Where bedrock pokes out of our pasture as ledge, there's a soft and greasy, easy-splitting mica schist—a metamorphic rock. Marble and slate are more familiar varieties of metamorphic stone. All are sedimentary (or other) rocks that were heated sufficiently by underground pressure to fuse, but not enough to cause a full meltdown and reformation as igneous.

Unless you can afford to have flat rock hauled in from the nearest quarried outcropping (in which case you can doubtless afford your own mason to go with it!), you, like me, will be building with what you have at hand. And, unless you have a *lot* of time and patience—or a pneumatic hammer and chisel to work stones into shape—you'll probably be using your native stone pretty much as you find it.

Where's that, you ask? Unfortunately for my garden, I've never had to search out stone myself. Rocks "grow" out of our New England soil as glacial erratics are pushed skyward each year by heaving frost. If you are not so blessed, look along creeks or riverbeds, where roads cut through rolling country, or wherever heavy construction is going on. Rock often crops up where someone doesn't want it and is consequently free for the taking. Even if you have to *buy* local stone, it is cheap. The loading and hauling is what'll really cost you.

Don't bother to try building a wall out of gravel or even a pile of fist-sized cobblestones. A lot of little rocks would give the wall so much travel that it would fall apart in short order. You want rocks that are a good double handful and larger . . . the bigger the better. (Some parts of the country offer great slabs of stone that need busting up and will give you a chance to learn what "hard labor" really means.)

To some degree, the kind and shape of your available rock will dictate the internal dimensions of your wall. It needn't decide *what* you build, however. There are cross-country walls in China and in Great Britain, pyramids in Mexico and in Egypt, and monuments and temples all over, each of "dressed"—squared and trued—stone of all varieties, laid by hand hundreds or thousands of years ago and still standing. Within an hour's drive of my own place are buildings and foundations of big stone, small stone, round stone, and flat stone. I know several local fences so well made, though of potentially unstable—almost globular—fieldstone, that they have lasted with no maintenance for 200 years.

The true limiting factors in wall construction are your own time and patience, your skill and confidence, the nature of the structure you are building, and—one more thing—whatever the local building code has to say about all that. Some places, the zoning mavens will be on you if you try to build a foot-high stone fence along your own garden path. If that happens to you, I'd suggest getting a permit to build a privacy screen; then do your work behind that. (Take the screen down after the next election, and no one will give a hoot.)

If there's enough rock in the neighborhood to erect a building, earlier generations will most likely have built with it. In that case, use the "grandfather clause" in your local zoning ordinance and building code that exempts old structures from new regs and simply rebuild on an existing building site or foundation. I've re-piled some dandy old stone buildings into shapes and sizes that the original architect couldn't have imagined . . . and I'm now halfway through building a foundation for a satellite dish antenna (!) onto the cellar hole of an eighteenth century root cellar on my place, no permit applied for or needed. Next year, my ten-year-old daughter Martha and I are planning to begin work on an old-style post-and-beam, mortise-and-tenon, pegged-and-slated barn on another "ancient" stone foundation: one I hadn't finished laying before first snow last fall. (Carved the date, 1787, on the cornerstone myself!)

Preparations for Building

We come at last to hands-on construction *and* to the one elemental truth of stone building. Adam Smith and Karl Marx would cringe in unison at the suggestion, but the main ingredient in a stone wall is neither the rock nor your own hard work. It's gravity. Arrange your stones in such a way that gravity keeps pulling straight down on them, and the wall will be standing long after you and I no longer can.

First, you'll need a proper foundation. The more permanent you want your wall, the more of it you must bury forever underground. The base of any wall expected to last a few hundred years must rest on bedrock if possible, otherwise on solid subsoil. So get yourself a cutting spade to slice out sod and a long-handled shovel to dig a trench. You will find that any ground cover cuts best in early spring before its root systems grab hold; in any season, it cuts easier when wet. Get out the sod and topsoil, and haul it to the compost pile. Then remove any loose rocks and cut out all roots. You may want to remove nearby trees as well. If they're left standing, their roots will—in time—grow back and heave any wall made, so long as there is soil on the other side for the roots to grow into. (Roots don't much bother walls around cellar holes—there's nothing beyond to grow into.)

If you live in the Snow Belt and want the wall to be a permanent monument to the time and labor you put into it, you should dig the foundation to below frost line. If you plan your walls as part of a building, particularly one that will house people or livestock, you *must* dig the foundation trench that deep. Simply put, winter temperatures freeze soil moisture, which expands and pushes everything above it up (such as those boulders that grow in my garden each winter). Then when soil warms in spring, the water thaws and shrinks, and the wet earth sags away from solid objects. A dry stone fence—which has more flex than one secured with mortar—absorbs the up-and-down and interior motion such alternate freeze/thaw imparts each season. Even one laid without much foundation will retain its integrity for years with only an annual patrol to replace fallen top stones. On the other hand,

a foundationless cemented wall will crack open the second winter. You don't want either cracks or falls with a house, barn, or shed . . . so put *any* building on a deep foundation.

Dimensions

The more width you build into your wall per unit of height, the bigger its footprint, and the more stable it will be. So dig your trench a good bit wider than the base of the wall and make it as deep as you can manage. I plan the footing base of my own walls to be about one and a half times their width at ground level, with a gradual upward slope from base to grade (the bottom of the trench to the top). I try to build each face sloping inward at about a 15-degree angle, called *batter*, from base to top (see Fig. 2).

The batter lets gravity pull the wall in on itself as well as straight down on each individual stone. No wall builder sticks to a single, strict height-to-width ratio, of course, and often as not, the availability of rock and the use to be made of the wall will determine your dimensions. Few rocks, and the need for a high screen, make for a thin, well-thought-out wall; lots of rock, and no need at all, produce nothing but a rock pile. Most of the massive New England stone walls that surround our place were raised mainly as somewhere orderly to stash an oversupply of glacial erratics—which were jutting out of the hayfield, just waiting to chip a scythe blade at mowing time—so they're good and wide. They also defined property lines. Many real estate deeds contain such language as ". . . 20-1/3 chains running 67.5 degrees along a stone wall from a large Chestnut, thence 62 feet to a blighted Elm, thence 115 yards 57.3 degrees along a loose stone fence . . .", and so forth. Today, only the stone walls remain, sad to say.

Laying Out

Next, find a length of twine and some stakes, and lay out your wall. Be sure to line the stakes straight and don't skimp on them. Too few stakes and a high wind can bow out your string, and you'll end up with an unwanted curve in your wall (see Fig. 3).

If you plan a wall more than a few feet high, you may want to make genuine *batter boards*, lengths of lumber fixed to a ground-level board at the desired angle of batter. Use them repeatedly, much as a carpenter uses the square, to check the angle of what's being built. A mason's level is sometimes helpful in setting individual stones, particularly at the top course and when leveling out stone tables, benches, and such wall furniture as gates and steps.

Always keep your guide string perfectly horizontal (use a hardware store *line level*—shown in Fig. 3—for this), because you'll use it to align the layers or *courses* of rock in your wall, raising the line as you build. Level courses are not essential on flat ground, and are hard to maintain precisely on any terrain if you're working with a lot of irregular stones. In Fig. 4, for instance, oddball, giant, and partly buried boulders made flat courses almost impossible . . . but it's a good wall nonetheless.

Still, you will want to try to keep your layers horizontal (*straight*), particularly on rolling ground, just to keep gravity pulling straight down (see Fig. 5). If you slope the courses going over a rise, in time the wall will sag downhill.

Building

With the wall laid out and the footing trench dug, the real challenge begins. Now you can start building. You will quickly agree that the more bricklike its shape, the easier a rock is to fit in. But save your heaviest thin stones to make a fine, flat top. Put your biggest and worst stones in the trench, rottenest side down. You may have to dig out holes at the footing bottom to accommodate the bumps ("wobbleknobs") in the real stinkers.

Try always to make the top of each course—even the underground ones—level and even, the sides parallel and square. Where you have a lot of little stuff you must use, try to alternate stacked thin rocks with thick single ones in a course, putting layers of thin rocks on each side of a single thick one, and avoiding backing multiple thins against each other where possible (see Fig. 6). Stacked thins will slide over one another, permitting the whole wall to slip off itself . . . much as a deck of cards will slough over when pushed with the palm of your hand.

Here your affinity for the craft and your own style will begin to develop. You may find it more satisfying to lay the entire bottom course first . . . or you may want to lay multiple courses, always keeping the lower courses out ahead of the upper by a few stones. Some folks find in their character a persuasive need to leave a minimum of open space, so they work for hours to create as closed and bricklike a wall as they can . . . others can tolerate a lot of gaps . . . still others like gaps, but will want to fill them with rubble and shims. The wall won't care which way you choose, provided the bigger rocks are laid properly.

Do it however your sense of order dictates: The wall will stand for a century or two (so long as you truly enjoy one another's company). But—fair warning—you may find, once you've tried it for a bit, that you just don't like wall building. It is hard, often sweaty labor that can leave you sore, bleeding, and grubby. Rock is a coarse artistic medium, demanding little fine motor control and permitting few precise furbishes. If you don't like it, if you find that you don't get real intellectual gratification from turning a rock pile into the beginnings of a proper wall, don't force yourself. Fill your trench with compost, and plant asparagus . . . which will provide satisfactions of a different sort.

Fig. 4

Fig. 5

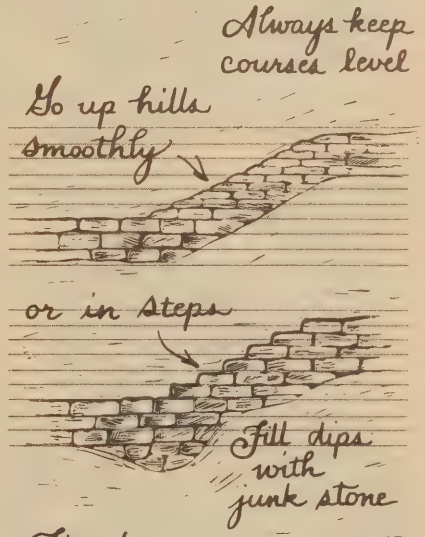

Fig. 6

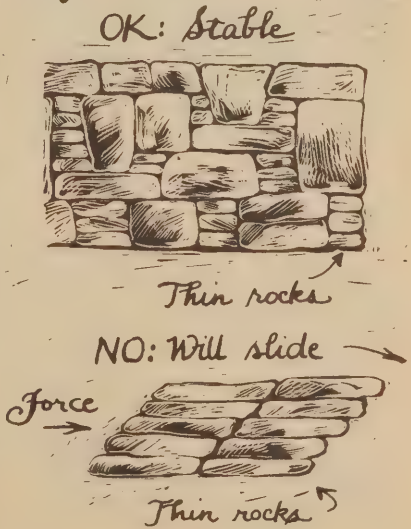

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Fig. 7 One over two

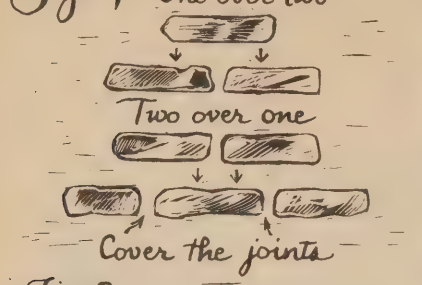


Fig. 8

Fig. 9

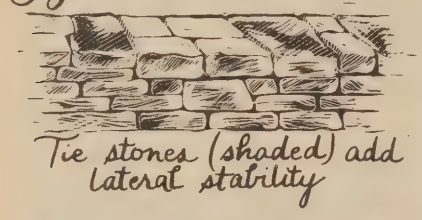


Fig. 10 Good end

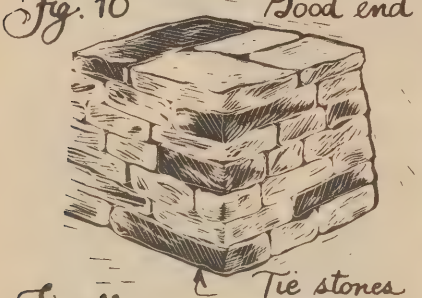
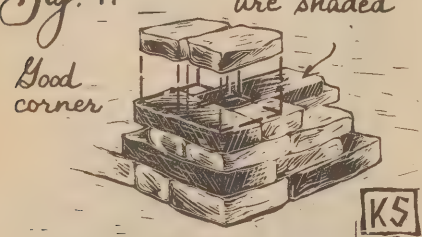


Fig. 11



EDITOR'S NOTE: John's book Building Stone Walls *expands on the subject of this article and also discusses how to quarry rock and build stairs, stiles, gates, and retaining walls. It costs $7.45 postpaid from Garden Way Publishing, c/o Storey Communications, Dept. TMEN, Schoolhouse Road, Pownal, Vermont 05261.*

Vivian's also the author of The Manual of Practical Homesteading *and* Wood Heat *and has recently (as he puts it) "returned to a hardscrabble New England farm after a last try at town life, where I missed—among a lot of other good things—building with stone."*

The Following Courses

Once the base course is laid, the fun of making a wall grow before your eyes begins. And we come to a few more basic rules of wall building. For one, you don't set or lay stones, you *drop* them (from a small height). Try to lay them in gently atop one another and you'll soon crush a finger in the middle. So drop the rock and move your hands out from under . . . *quick*.

And always lay stones as flat as possible, and according to the old-time formula: one-over-two, two-over-one (see Fig. 7). Put another way, always cover an up-facing joint between two rocks with the solid undersurface of another. This rule applies in the vertical dimension, as well: Put one beside two beside one, and so on.

Finally, no proper wall builder ever hefts a rock more than once. All the selecting and adjusting is done mentally beforehand. I am told that there are some wags who maintain that we stoneworkers just never *own up to* lifting a rock more than once . . . but they're most likely folks who've watched from a distance but never hoisted a stone themselves. And anyone who can watch a mason at work and resist the urge to pitch in for a while—at least long enough to learn the facts—is not to be believed in any event.

Avoiding Runs and Tying

If you fail to cover too many joints, you'll create vertical *run*, and the wall will fold at the crease (see Fig. 8). Properly lapped, the rocks in a dry wall will shift with the seasons but not fall out too quickly.

From time to time, and as the rock permits, *tie* the faces of your wall. That is, lay a long rock crossing the width of the wall, so as to cover all the rocks in the course below, as shown in Fig. 9. This adds lateral stability.

Some builders like to pull in giant rocks that will fill an entire section, interrupting the courses and forming a solid pier. Presumably this helps stabilize the wall by reducing lengthwise, along-wall shift. Personally, I feel that a giant in a wall invites fall-out the same as excessive run, but experienced masons don't always agree. (Indeed, I'd say that they tend to disagree more often than not.)

Another topic of dispute is chinking: Do you chink *in* or *out*? That is, when rock surfaces don't mate well or where there is a substantial gap in a face, do you fill these holes with shim rocks laid big end inside the wall (chinked "out")? Or do you hammer in a wedge-shaped shim from the outside (chinked "in")? I do it both ways and so will you, I imagine, though chinking out takes the most time.

As you build, try to imagine the effect of gravity on each rock as you place it, *setting each stone so as best to keep gravity pulling straight down on your wall.* I like to have the rocks in all the courses angling down slightly toward the center of the wall: that is, to have rocks in each face slope in and down toward the midline a bit. Not always possible, but a help in aiding the wall to hold itself together.

Ends and Corners

The sections that make your wall-building reputation are the ends, especially the ones that butt up to public view. I've known wall builders to haul good end stones for miles to make a lasting impression on posterity. You want the ends to hold up unaided; there's no more wall beyond them to rest against. So save the biggest and best square and long stones you can for ends. Then tie alternating courses in opposite directions (first face to face and then back into the length of the wall). See Fig. 10. For a really permanent end, extend your footing out in a wedge in front of the wall as far as you can.

A corner is a pair of ends built together, but here you tie alternating courses into first one and then the other length of wall. Since the wear of the seasons will have the wall heaving at the corner from both lengths, it should be stronger than a simple end. So save the best tie stones for corners (see Fig. 11). A giant may even find good use here.

And that's about it. Let's summarize: To build a good stone wall, dig as deep a footing as you can, lay the courses parallel and level, and be sure to alternate thicknesses within them. Keep to the one-over-two principle, and tie your ends and corners well. Save the heaviest and flattest rocks for the top course (and shim the top flight well if there will be people or creatures running along your wall). Do you want to build in a gate, too? Then make two ends and hang a wooden door from hinges mortared into the cracks in the rock.

Putting up a stone building is another topic altogether, if only because the building codes enter in. Still, the wall-raising principles are the same; just increase your dimensions. A cellar is nothing but a really deep footing trench, dug square and scooped out in the middle. A doorway is two ends with a heavy timber or long, squared rock for a lintel. The front of a fireplace is a low door, and a window is a half-door. You frame windows and doors, set plates, and fasten roofing the same as in concrete-block construction (and there are plenty of how-to books around on that).

Frankly, I don't trust my own stonemasonry enough to try a pure dry-laid or even a mud-matrix-filled stone building, so Martha and I will use steel reinforcing rods and a mortar-rubble matrix inside the barn's planned rock walls . . . which is the same principle—with a few modern embellishments—used in that old Pennsylvania Dutch barn that got me into stonework in the first place. We'll be laying a parallel set of thin but solid freestanding stone walls a few feet apart, then filling in the interior as we go.

It's a good project to think about. Just now the snow lies thick in the pasture, but spring can't be that far off. I can hardly wait for thaw so I can get at the rock pile out back.

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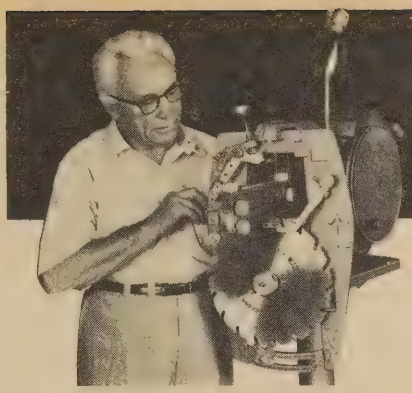

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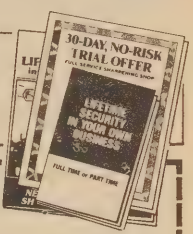

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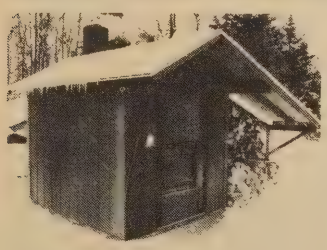

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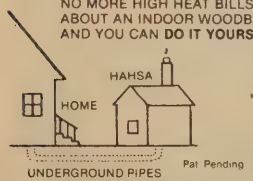

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Tom Bigelow

Even in the midst of the currently ballyhooed worldwide oil glut, American petroleum companies continually explore and develop new oil and gas reserves. Because of this, private landowners can often cash in on those geologic commodities by agreeing to lease some of their property for exploration and drilling purposes . . . assuming, of course, they own the mineral rights to their land.

Not surprisingly, there are significant advantages *and* disadvantages to such a proposition. The potential pluses may include substantial income (and even free natural gas!), while some of the possible drawbacks are tied-up land and visual—or other—pollution. And the best way to determine whether the benefits of leasing acreage will outweigh the costs is to become familiar with the procedures of the oil and gas companies . . . *before* signing on the dotted line. In the following paragraphs, then, I'll attempt to outline just what can be expected in a standard leasing endeavor.

THE AGREEMENT

As with most other contractual agreements, an oil and gas lease is a binding document covering a specified time, price, and set of conditions. The contract states that the owner willingly allows the energy company (or well operator) access to his or her property and gives its representatives the right to prepare the site as needed and to drill and produce any oil or gas thought to be present.

In return, the well operator agrees to pay the landowner a specified "rent" for each acre leased, plus a share in the profits of the well if it begins producing oil and/or natural gas.

THE RANGE OF COMPENSATION

The conditions and financial arrangements for leases will vary, depending on factors such as the geographic location and the number of productive wells in the surrounding community. (The greater the chance of locating oil or gas, the higher the "per acre" price.)

As a rule of thumb, the amount paid for leasing rights in the eastern United States is anywhere from $5 to $25 per acre yearly. In high-production areas where there is a lot of drilling activity (the West Virginia border is one example), prime acreage can bring $50 to $75 per acre.

In Texas and the Southwest, the annual amount paid is usually between $50 and $75 per acre, with prime acreage going for $200 or more. Prices vary greatly in the Rocky Mountain region, though . . . from as little as $10 per acre in unexplored locations to as much as $1,000 per acre in proven high-production areas.

Since "rental fees" are so localized, an interested landowner who wants to make sure he or she will get a fair deal should tour adjacent counties and speak to current leaseholders to find out the amount of drilling being done in the region and the price being paid.

SHORT VERSUS LONG TERM

Of course, the *length* of the lease also affects the amount of compensation the owner can expect to receive. The shorter the lease, the less the payment. By the same token, the longer you agree to tie up your land, the more rent the well operator will be willing to pay.

Generally speaking, the smaller, independent petroleum companies are often able to move in and drill a well more quickly than the larger corporations can, so they're usually more willing to accept a shorter lease (for six months, one year, or two years). The major oil companies, however, tend to be more interested in larger blocks of land and longer leases . . . in order to allow them plenty of time to conduct seismic and geomorphic work before drilling. Either way, if a lease *expires* before the well operator has completed an exploration program, he or she must negotiate a new one. This is because the oil and gas rights revert back to the landowner once a lease ends . . . *unless a successful well has been drilled.*

Note the implications of that last phrase. It means that if a well has been completed and is producing by the time the lease expires, the operator owns the rights to extract from that well for as long as it remains productive (which, most of the time, is from 10 to 20 years).

SHARING THE PROFITS

On the average, a landowner receives a one-eighth interest in a producing well drilled on his or her property. In highly competitive, very productive areas, he or she may get a three-sixteenths share, or perhaps even a one-fourth interest on the well. Such fractions can add up to a significant income.

For example, based on the current price of $29 per barrel of crude oil, the landowner with a one-eighth interest on one well could expect to receive about $3.60 for every barrel of oil produced (a barrel equals 42 U.S. gallons). Considering that the average well in the U.S. produces about ten barrels of oil a day (and that estimate is conservative), the landowner would pocket a monthly royalty totaling $1,080!

In addition, if the lease involves a large tract of land, the well operator may initiate a multiple-well program that would entitle the owner to a monthly royalty check for *each* successful well. (On the other hand, of course, a well driller may just as likely come up with nothing but dry holes, in which case the landowner would receive no compensation beyond the original "per acre" lease fee.)

OTHER POTENTIAL PERKS

Homesteaders seeking greater self-sufficiency might consider a common fringe benefit of drilling more desirable than the cash rewards. In the event a successful well taps into a natural gas reserve, the landowner can divert some of the gas flow into his or her home for heating and cooking purposes, *so long as* a clause to this effect has been written into the lease. It's easy to see how the thought of a 10- to 20-year supply of free natural gas can be a very appealing incentive to homeowners (especially with today's escalating utility costs!).

THE FLIP SIDE

Although such prospects are alluring, there are definitely several disadvantages to consider before you rush into an agreement with the first oil company you find. It's important to remember that leasing your property—whether it be 5 acres or 500—essentially means "sharing" the land . . . a situation which may or may not fit into your long-term plans for the property. True, it's hardly likely that the surrounding acreage *must* sit idle while a small tract is being drilled upon. Still, that land may be disrupted at any time by exploration and developmental activities.

Building an access road may be the first disturbance. The driller will use dump trucks, bulldozers, and other excavating equipment to construct a roadway to the well site . . . removing trees, topsoil, vegetation, and other ground cover in the process. The driller may then elect to haul in gravel, or may just use the existing subsoil as a roadbed.

The number of trees you'll lose will depend on your land and on the length of the access road and its proximity to the well site. The workers will either cut the trees down with a chain saw or simply uproot them with a bulldozer. The landowner, though, can claim all the cut timber from his or her property . . . *provided* that's been written into the contract.

Further work will be done at the well site. Preparation before drilling includes leveling the terrain so that the rig can sit flat on a cleared spot and digging a holding pit for the used drilling fluids (which include salt water and drilling muds).

Moreover, unless all this excavation is done properly, soil instability and erosion problems may result. These—if left unchecked—can create trenches and channels that accelerate the washing away of the soil's vital nutrients.

Other possible, though infrequent, complications include seepage of drilling fluids into nearby streams and water wells . . . oil spills . . . and injuries to humans and animals (either through direct contact with the equipment or by contamination of water supplies and vegetation).

Then too, once the drilling is completed, production equipment such as pumping units, storage tanks, valves, and fittings will have to be secured in place at the site for the entire life of the well. The constant noise of that pump engine sucking up the oil, and the visual incongruity of the oil-field equipment may be bothersome to both you and your neighbors.

THE AFTERMATH

In almost every state, a well operator is required by law to restore a drilling site to its original condition, or as close to it as possible, once the drilling is completed. This in-

cludes cleaning up the site, recontouring the terrain, and replanting vegetation. Though most operators try to do a good job, a problem still remains with those few others who'll shrug off their responsibilities and do the least possible amount of restoration.

You can help prevent problems by staying abreast of the well operator's activities . . . *and* by questioning the drillers during each phase of the operation. The more informed you can be about what's taking place on your property, the better off you'll be.

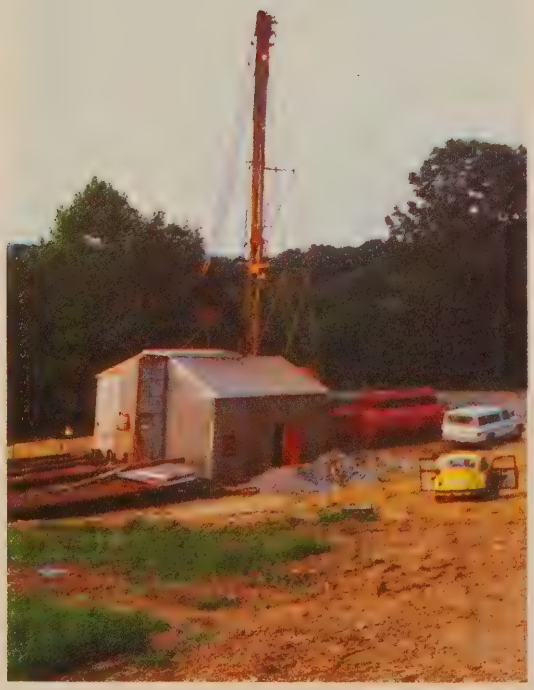
The best way to protect yourself from a disreputable oil and gas operator is by requesting the names of other people from whom the driller has previously leased property, and then by traveling to those locations to witness firsthand the extent to which the land has been restored. Try to discuss the operator's credibility with those owners before you agree to hand over your holdings to that driller. Thoroughly checking the operator's reputation is the most reliable way to avoid getting stuck with a sour deal hidden in a sweet wrapper.

If all signs point to "go", however, then you might be able to cash in on an often overlooked benefit of country living . . . income from oil and natural gas rights.

LEFT: Mobile rotary rigs are driven to the well site and are usually self-contained. The rig's drill bit rotates as it drills the well. ABOVE: Storage tanks or "batteries" hold the crude oil until the transport trucks can haul it to the refinery. In high-activity areas, pipelines carry the crude to its destination.

GAS PRODUCTION

PHOTOS BY THE AUTHOR



LEFT: A productive well may be literally "in your backyard", depending on the region's geology. ABOVE: Cable-tool rigs are still used in shallow well areas. These rigs use a pounding motion to drive the pipe into the ground.

Are you thinking of taking up a folk instrument? Then come along as a well-known mountain musician surveys the pros and cons of the most popular musicmakers.

FOLK MUSIC INSTRUMENTS: CHOOSE THE ONE THAT'S RIGHT FOR YOU!

David Holt

To me, musical instruments have always seemed more like living beings than inanimate objects. Like people, each has its own personality, peculiarities, limitations, and—of course—its own special sound. It takes a while to get to know one, too: Most musicians have to play an instrument for years before they fully realize all that it does or *doesn't* have to offer them. To help you save some of that time, I've tried to lay out the qualities—good and bad—of the seven most common stringed folk instruments. So, if you're thinking of learning to play folk music, perhaps this article will make your choice of what to play it on a little easier . . . and sounder.

Before we consider specifics, let's talk about learning to play music in general. First of all, I think almost anyone can become a decent musician on almost any instrument. The key factor is . . . interest. That's right, not talent, but *interest*. I've seen many very naturally skilled people give up playing, while others with only moderate abilities—but a great deal of enthusiasm—keep at it and become good musicians.

So, in choosing your melody-maker, it's important to pick one that inherently fascinates you, one you'll love to hear in good times *and* in bad. Keep in mind that in the early stages of learning you're going to have to go through screeching and scraping with any stringed instrument . . . so choose one that will keep you involved. (Sounds a lot like a romantic relationship, doesn't it?) Moreover, I think that most folks have a natural ability on certain instruments, while they might have to struggle unnecessarily on others. I know the banjo has always been easiest for me. It feels right in my hands, and it has a sound I never get tired of hearing. In short, I guess I'd

[1] A hammered dulcimer. [2] Clawhammer (left) and bluegrass (right) banjos. [3] The lap dulcimer. [4] Go ahead . . . pick one!

STAFF PHOTOS

have to say that the banjo just *makes sense* for me. That special, hard-to-describe attraction to a certain instrument comes from within you . . . and makes learning to play it a pleasure.

Besides examining your inner feelings, you might want to look at some of the practical aspects of the different folk instruments. Let's start with the most popular one of all.

THE GUITAR

Along with the piano, the guitar is one of the most versatile instruments ever invented. Almost any style of music can be played on the six-stringer. It can be acoustic or electric and can be used to back up a singer and/or other instruments or for solo "stepping out". And—not the least of its virtues—the guitar can be carried in one hand (which certainly can't be said of the piano!). You never have to worry about outgrowing it, either, because there's always something new to learn. There are lots of good guitarists to listen to for ideas, and plenty of qualified teachers. The guitar is limited only by the creativity of its player.

For the beginner, the guitar can be pleasant to listen to almost from the first day . . . after learning to tune the instrument and play a few basic chords. There are endless numbers of songs you can play and sing along with, even if you know only three chords and a single strum pattern. And you can quickly build your repertoire and technique from that base.

The guitar is also the perfect accompaniment to other stringed instruments, often filling in behind banjo, fiddle, or mandolin. In many cases, it's the "glue" that holds an ensemble together. I believe that anyone who plays any of the many other stringed folk instruments would benefit from knowing the basics of the guitar . . . if for no other reason than to be able to play along with a group by visually following the guitarist's chord changes.

There are only a few drawbacks to learning to play this instrument. Prominent among these is that the strings—especially on a steel-string model—are hard to press down at first. That's no big deal, though. Just keep playing, a little every day, and your fingers will toughen up. The second problem is that *everyone* seems to play the guitar. Whereas an autoharp player draws "oohs" and "aahs" at the first note from his or her unusual instrument, the average guitarist gets little but yawns. So if you're after attention, you'll have to get *good* on the guitar: Then you'll get all you need!

The two major styles of guitar playing are *flatpick* and *finger*. A flatpick is a small piece of plastic—held between the thumb and first finger—which is used to "pick" individual notes on a string or to strum chords. With the flatpick, you can play a rapid succession of notes . . . and play them with a great deal of force and drive. This style is used in rock, jazz, country, and bluegrass music. For an example of what can be done with this little piece of plastic, listen to an ace acoustic picker like Doc Watson.

Fingerpicking *generally*, produces a more gentle sound (there are plenty of exceptions, though). In the folk style, a bass-note pattern is maintained with the thumb (with or without the use of a thumbpick), while the melody is played on the "high" strings with the fingers. Listen to Merle Travis or Chet Atkins for prime examples of this graceful style . . . or to the Reverend Gary Davis' recordings to hear full-tilt, fingerpicked ragtime and blues.

You'll most likely find that you have a natural inclination toward using a pick or your fingers. Follow that feeling, of course, but be aware that by versing yourself in *both* styles, you'll greatly expand your musical range.

THE BANJO

There are at least four distinct types of banjos, and more than twice that number of playing styles. But one thing that they all have in common is their lively, upbeat, vibrant sound. Listeners invariably respond with enthusiasm to the banjo. When I first migrated from the plains of Texas to the mountains of the Southeast, I traveled with a talented banjo player named Steve Keith. I can still recall vividly how we'd come into a mountain community as total strangers . . . then Steve would head for a local hangout and cut loose with his old-time banjo. Almost with the first note, the whole town would seem to open up to us. It was like magic! In fact, it *was* magic. And after I saw it happen a few times, I decided I wanted to be able to do that myself, so I began playing the banjo. (And I must say, it works!)

There are two major types of banjos: five-string and four-string. The five-string is perhaps the best known. One of the nice things about this instrument is that it's generally tuned to an "open" G chord (just strum the unfretted strings, and you get a G), with the fifth (shorter) string acting as a drone. The open tuning also makes picking out melodies relatively easy. The five-string banjo is played in at least three different styles, and the one you choose will almost dictate the kind of music you'll eventually perform.

Bluegrass or *three-finger* style is the most popular type of banjo playing today. Tunes such as "Foggy Mountain Breakdown", "Dueling Banjos", and the theme from *The Beverly Hillbillies* have brought this type of banjo music to almost every man, woman, and child in America. In this style, the instrument is played by putting fingerpicks on the thumb, index, and middle fingers of the right hand, and then doing highly syncopated "rolls" on the strings. Bluegrass banjo has an incredible amount of drive and rhythm, but it does *not* make a good solo style: If you're going to get skilled at it, you'll have to play in company with at least a guitarist or another rhythm player.

The old-time banjo style is sometimes called *clawhammer* or *frailing* and is usually played on an open-back instrument. It originated in Africa and was spread throughout America by the minstrel shows of the 1850's. The technique consists of picking down on the strings with the fingernail of the index finger and the side of the thumb. This style of banjo doesn't have the hard-driving, highly syncopated sound of bluegrass, but offers a more laid-back feel. Since it can be played either with chords or with "notey" melodies, it makes a great accompaniment for vocals and other instruments.

Clawhammer style is particularly well suited for rhythms of traditional mountain songs, fiddle tunes, and other types of folk music . . . while it's not easily adapted to jazz, swing, blues, or Irish jigs. If you like authentic mountain music, you should learn this old-time style.

The third of the five-string banjo styles is *classical*. It gained popularity during the late 1800's and still attracts a good deal of interest, particularly in the Northeast. The classical banjo is strung with nylon or gut strings and is played with all five fingers of the right hand, without the use of picks. Music reading is a must for the classical style, as much of the repertoire is learned from sheet music. You will hear very complex ragtime, classical, and semiclassical pieces in this style, as well as a few popular and newly composed works.

The four-string, or *tenor*, banjo has a shorter neck than does the five-stringer and is played with a pick. This is the instrument that most people associate with Dixieland and early jazz music. It's also used as a lead instrument in many Irish folk tunes and as a rhythm-maker in old-time string bands. As a lead instrument, the tenor is played in the mandolin style—in which the melody notes are picked individually—or in the chordal style, in which each note of a melody is played with a different chord.

Another type of four-stringer is the *plectrum* banjo, which has a neck the same length as the five-string instrument, but lacks the fifth string. The playing technique is similar to that used for the tenor, but this banjo is suited less for rhythm and more for lead.

Actually, there are more four-string banjo players in the U.S. than there are five-string pickers (though they seem to get a lot less attention). Tenor and plectrum playing is particularly strong in the Midwest and the West, but you can probably scout up a good teacher in any major city.

THE DULCIMER

The dulcimer has been around for a couple of centuries in the southern Appalachian Mountains, and its popularity has spread until the instrument can be heard almost everywhere in the country today. In its traditional form, the dulcimer has three strings: one to play the melody on, and the other two to act as drones. That makes the old-time style of playing easy to learn and pleasant to hear. All you have to do to play a melody is to move your finger—or a wooden "noter"—up and down a single string on the fretboard. To achieve minor and other modal notes, you merely have to change tunings.

But that's only for the *traditional* dulcimer style. Today, you can find the instrument with almost any number of strings and being played with a variety of techniques. For example, melodies and chords are sometimes played on *all* the strings, rather than just one. Folks are performing all kinds of music on dulcimers these days, too . . . from folk and popular to classical and jazz.

One of the foremost drawbacks to the dulcimer is that it's a quiet instrument (though to many aficionados, this intimacy is an *asset*). It's also difficult to play the dulcimer in just any old key, or to play complicated passages . . . because the instrument wasn't designed for that type of music. But people are working around these limitations, and are producing some beautiful, complex music in addition to traditional-style tunes.

THE HAMMERED DULCIMER

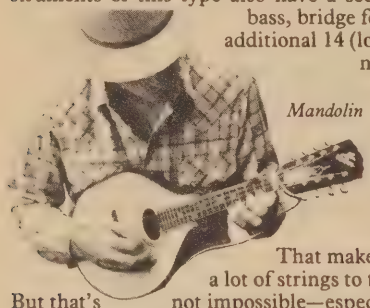
Over the last ten years or so, this ancient instrument has been enjoying a fervent

(continued on next page)

(continued from preceding page)

nationwide revival. Most people fall in love with the hammered dulcimer the first time they hear it. There are increasing numbers of devotees who build and play the hammered dulcimer, and interest just seems to keep on growing.

This trapezoidal dulcimer is played by tapping on its strings with small wooden hammers. In its simplest form, the instrument has a single bridge that divides the multitude of strings running across its face. The arrangement gives a different note on each side of the bridge, the two being separated by a fifth interval. To give the instrument its characteristic full sound, two to four strings are grouped together and tuned to the same note. This grouping is called a *course*, with most hammered dulcimers having from 12 to 14 of them. Most modern instruments of this type also have a second, bass, bridge for an additional 14 (lower) notes.



Mandolin

That makes for a lot of strings to tune. But that's not impossible—especially with the help of today's electronic tuning devices—and the beautiful sound of a well-tuned hammered dulcimer makes it worth the trouble several times over.

The hammered dulcimer is diatonic (that is, it includes a scale with five full tones and two semitones) in certain keys, usually A, D, G, and C. And since most folk tunes are played in exactly those four keys, the hammered dulcimer is perfect for traditional music. You can hear all types of melodies being tapped out on this instrument nowadays, including fiddle tunes, ragtime, classical, and even some pop and swing.

Despite all those strings, the hammered dulcimer is easier to play—in some ways—than other stringed instruments. For instance, since your wrists do most of the work, you don't have to spend years learning to use the intricate muscles of your fingers. The *bad* news is that you have to be precise. There's almost no way to cover up a mistake . . . it just rings on and on. It's also difficult to see where you are as you bounce your hammers rapidly across the strings, but this gets easier with practice.

The hammered dulcimer is primarily a lead instrument. While you can play chords by hitting two to four strings at a time, the instrument certainly isn't the best for accompanying others. And, since you can't "slide" into notes, you can't put much blues into tunes played on this musicmaker.

Another thing that you should be aware of is that other musicians sometimes come to, well, *resent* hammered dulcimer players. There are at least two reasons for this. The first is something akin to artistic jealousy. Your fellow players may have worked for years to develop their instrumental style, and hardly anyone notices. But let a hammered dulcimer player just give a *ping, ping, ping* on his or her strings, and a crowd will begin to gather. (Of course, this problem is simultaneously one of the *assets* of the hammered dulcimer.) In addition, it can be dominating . . . almost dictating the style the other musicians in the band must play. Obviously, though, both of these drawbacks can be minimized if you simply use diplomacy.

THE AUTOHARP

Here's an instrument that was invented with ease of playing in mind: All you need to do to get a chord is to push a button and strum the strings! With a minimum of practice, then, you can master a guitarlike strum and be ready to accompany singing. It's even easy on your fingers when you're learning to play. And if you play the harp while holding it upright, you then learn to keep the strum going with your thumb and to pick out simple melodies with your index and middle fingers.

The autoharp produces a sweet, full sound, and is best used to accompany singing or to play melodies with a moderate tempo. However, it usually offers only a given number of chords. Also, the technique of playing is somewhat restricted, so it's hard to run off fast passages of eighth or sixteenth notes. But for most people, it's the *tuning* of those 36 strings that's the real nemesis . . . and accurate tuning is critical to the quality of autoharp music. But again, you can call on a pitch pipe or an electronic tuning device to help you out.

THE FIDDLE

Call it fiddle or violin . . . it's basically the same instrument: The real distinction is the style in which it's played. Many musicians feel that the fiddle is the king of acoustic instruments . . . the most difficult to play, *and* capable of the greatest range of tone and feeling. There are almost no limits to the types of music it can play. True, the fiddle's not much of an instrument for accompanying solo singing or for sounding full chords, but other than that, you can do almost anything on it.

The very things that make the fiddle difficult to play are the attributes that give the instrument its expressive range. To begin with, the fingerboard has no frets. That means you have to put your fingers down in precisely the right place each time to get a clean note, and that takes a lot of practice. But the *advantage* of not having frets is that you can slide into or out of notes, which is part of the reason the fiddle is such a great jazz and blues tool.

While the left-handed, fretless-fretting technique may sound difficult, it's really the *bowing* that makes the instrument unique, wonderful . . . and maddening. When drawn steadily across the strings, the bow can make the fiddle sing in beautiful, rich tones. Or, with short, quick strokes, it can spit out notes at lightning speed. But in the hands of the beginner, the bow only squawks, requiring nerves of steel to get through the early stages of learning (and a great deal of patience from your family and friends). You *can* get the hang of it, though, if you just *keep trying*.

The bowing technique is the primary thing distinguishing the folk fiddle from the classical violin. In fiddling, a loose wrist is essential . . . whereas a classical violinist generally uses a stiffer technique. (That's why classically trained violinists often sound so stiff when they try to fiddle.) The two styles aren't mutually exclusive, you just have to practice *both*. Certainly, *some* classical training can help any fiddler get better intonation and tone.

If ever there was an instrument that you couldn't learn halfheartedly, it's this one. You've got to have a passionate interest in learning to play the fiddle to keep at it long enough to make it sing. But what a joy when it does!

THE MANDOLIN

The mandolin is tuned like the fiddle: in fifths, which makes it "logical" (that is, the next note up or down the scale will always be right where you expect it to be). Unlike its musical cousin, though, the mandolin has double strings and is played with a pick, giving the instrument a bright, lively sound with very little "sustain". It's also capable of producing the full range of chords. And, because the instrument has frets, you can play it with your left hand more easily than you can the fiddle (though its double strings are harder to press down at first).

The mandolin can play melodies or serve as an excellent rhythm instrument. Because it lacks a full bass tonal range, though, it's not a great soloist. But even with just a single guitar for backup, the little gem is superb for almost any style of folk music.

As is the case with playing most instruments, it's the picking hand that takes the most work. For the mandolin to sound its best, you have to play rapidly, accurately, and forcefully . . . not an easy task on such a small instrument. *[EDITOR'S NOTE: A MOTHER staffer who's been a happily struggling mandolin player for over a year reports that he's still learning to play* tremolo . . . *that fast, single-note fluttering that's such a distinctive part of the instrument's sound.]* But once you've got the basics, the mandolin can make music that's sweet and simple, hard and driving, or wild and jazzy.

CODA

People often ask how long it will take to master a certain instrument. Well, the only answer is . . . a *lifetime*, of course! That's part of the joy of music. But figure on taking a year to get over the initial hump . . . to get the basics in hand and reach a point where you have some control over the instrument.

To make that happen, you'll have to practice a little (or a lot) each day. Keep at it! Look on practice as a meditation, a chance to concentrate. In no time you'll begin to see (and hear) real progress. Ongoing learning is half the fun of playing, and you'll never regret the time spent with your instrument. It'll become a friend for life.

EDITOR'S NOTE: David Holt has an album—"It Just Suits Me"—that features mountain music on old-time banjo, hammered dulcimer, harmonica, guitar, and (really!) paper bag. You can order the album for $9.50 postpaid from High Windy Records, Dept. TMEN, Box 553, Fairview, North Carolina 28730 . . . or write for his free catalog.

If you'd like some good reading to help you along the musical road, look into Marc Bristol's 144-page book, Homegrown Music, *which is packed with lessons for guitar, dulcimer, and lots of other folk instruments, along with instructions for making instruments yourself.* Homegrown Music *(Madrona, $8.95) is available from Mother's Bookshelf®, 105 Stoney Mountain Road, Hendersonville, North Carolina 28791 for the list price plus $1.25 shipping and handling.*

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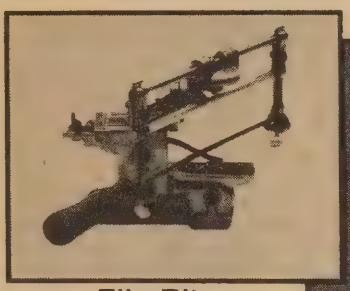

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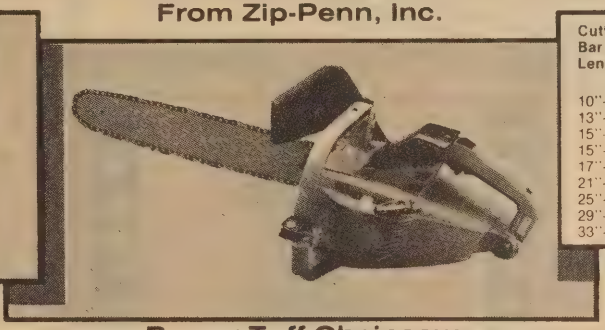

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It is high time that I too, add my thanks and appreciation for your quality products. I ordered your double barrel stove last year and have been amazed at its efficiency! Many of my friends have bought $500 stoves, and after they see mine, they just shake their heads in defeat. I heat my entire home with it and have no problem in getting it to burn for 24 hours or more! Therefore, I would like to order two Monster Mauls. After reading what Mother Earth News said about it and having been completely satisfied with your stoves, I know it is what I want. Thank you again for being what I consider an honest company.

Ben Sincell, Oakland, Md.

EQUALLY SMART

I am pleased to order one of your famous Monster Mauls. I have used one in the past and found it to be unequalled in strength, durability and ease of use. Your ad says there is no need to be a strong man; that's for sure, because I'm a woman!

Cynthia Smith, Bristol, Vt.

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I have really been impressed with your 12# Maul. Prior to purchasing it I had used a 8# Go-Devil which had the problem of getting stuck..This was a time consuming problem. I saw your ad on the Monster Maul in one of my farm magazines, and decided to try you out. I must admit I was doubtful that it would work as well as your ad showed. I had several large pieces of oak that had been giving me fits trying to split. I unpacked my new Monster Maul and took it out to the old wood pile. Was I surprised, even though it was 4 lbs. heavier than my old go-devil it was much easier to swing. (Seem to be much better balanced.) It never stuck once, and did I ever split that oak up. A believer I became. My biggest problem now is keeping my neighbors away from it so I can use it myself. . . .I really appreciate your products.

J. Allen, Greenville, Tenn.

HYDRAULIC CHALLENGE

I have easily split several cords of firewood consisting of white oak, cherry, poplar, and maple, all with amazing speed and with minimal physical exertion. I've even participated in a "Sportsman's Challenge" against a hydraulic splitter, against which my...maul proved much faster. My only regret is I have now sold the maul to the owner of the gas powered hydraulic splitter, who was completely amazed by its performance. During these times of phony advertising and cheap workmanship, I am truly thankful to find a firm who is honest and sincere and provides quality products.

David A. Hojnacki, Monroe, Mi.

THE TRIANGLE

Received your Monster Maul. We appreciate very much your expediency in getting it to us. It took only a few days and the results concerning its use are absolutely fantastic. We can split 4 cords of wood a day. The main problem is the fact we have 3 men to split wood, and only one Monster Maul. Therefore, I am enclosing sufficient funds to purchase one more.

Gene Chase, Trails End Farms, Lawrence, Kan.

MOM's 1984 "Wishbook" Guide to Herb Suppliers

We've gotten you well started on your 1984 garden, we hope, with our list of general seed companies on page 61 . . . but what's a garden—or life, for that matter—without herbs? And although we admit we're prejudiced on the subject, we do urge you to explore the wonderful world of herbs and spices if you haven't already done so. To help get you going, we've compiled a list of 24 companies that specialize in this field. Some deal primarily in plants and seeds while others sell dried herbs, books, and herbal products (culinary blends, essential oils, medicinal preparations, personal care products, potpourris, and so on). Along with each company's main offerings, the cost—and occasionally, the special nature—of its catalog has been indicated.

Please note that some of these companies carry other items, such as ornamental and culinary plants and seeds, and books and tools related to general gardening, as well as herbs. Furthermore, many of the major seed companies (such as Parks and Burpee) also offer herbs.

And now, happy shopping . . . and *growing*!

Abracadabra
Dept. TMEN
P.O. Box 1040
Guerneville, California 95446
(seeds . . . $1.00 catalog includes packet of seeds)

Aphrodisia
Dept. TMEN
282 Bleeker Street
New York, New York 10014
(dried herbs, products, books . . . catalog $2.50)

Caprilands Herb Farm
Dept. TMEN
Silver Street
Coventry, Connecticut 16238
(plants, seeds, products, books . . . catalog free with SASE)

Caswell-Massey Co., Ltd.
Dept. TMEN
111 Eighth Avenue
New York, New York 10011
(products . . . catalog free)

Fox Hill Farm
Dept. TMEN
Box 7-ME
444 West Michigan Avenue
Parma, Michigan 49269
(plants, books, culinary products . . . catalog $1.00)

Hemlock Hill Herb Farm
Dept. TMEN
Hemlock Hill Road
Litchfield, Connecticut 06759
(plants . . . catalog 50¢)

Herbal Effect
Dept. TMEN
P.O. Box 6
Carmel Valley, California 93924
(dried herbs, products . . . catalog $1.00)

The Herb Garden (cooperative)
Dept. TMEN
Route 2, Carson Road
Pilot Mountain, North Carolina 27041
(plants—spring only—and products . . . $1.00 catalog includes sample packet of herbs)

Herb Products Co., Inc.
Dept. TMEN
P.O. Box 898
North Hollywood, California 91601
(dried herbs, products . . . catalog free)

Hilltop Herb Farm
Dept. TMEN
P.O. Box 1734
Cleveland, Texas 77327
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Indiana Botanic Gardens
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Hammond, Indiana 46325
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Le Jardin du Gourmet
Dept. TMEN
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(plants, seeds, books . . . $1.00 catalog includes sample packets of herbs and recipes)

Meadowbrook Herbs and Things
Dept. TMEN
Whispering Pines Road
Wyoming, Rhode Island 02898
(products . . . catalog 50¢)

The Naturalists
Dept. TMEN
P.O. Box 435
Yorktown Heights, New York 10598
(seeds . . . catalog free)

Nichols Garden Nursery
Dept. TMEN
1190 North Pacific Highway
Albany, Oregon 97321
(plants, seeds, products . . . catalog free)

Penn Herb Co., Ltd.
Dept. TMEN
603 North Second Street
Philadelphia, Pennsylvania 19123
(dried herbs, products, books . . . catalog $1.00, refundable with first order)

The Rosemary House
Dept. TMEN
120 South Market Street
Mechanicsburg, Pennsylvania 17055
(plants, seeds, products, books . . . catalog $1.00)

Rutland of Kentucky
Dept. TMEN
P.O. Box 16
Washington, Kentucky 41096
(plants, seeds, products, books . . . catalog $2.00)

Sandy Mush Herb Nursery
Dept. TMEN
Route 2, Surrett Cove Road
Leicester, North Carolina 28748
(plants, seeds, products, books . . . catalog $1.00, refundable)

San Francisco Herb Company
Dept. TMEN
250 14th Street
San Francisco, California 94103
(dried herbs, products—large orders only, $50 minimum—catalog free)

Sunnybrook Farms Nursery
Dept. TMEN
P.O. Box 6
9448 Mayfield Road
Chesterland, Ohio 44026
(plants, seeds, products, books . . . catalog $1.00, refundable)

Taylor's Herb Gardens, Inc.
Dept. TMEN
1535 Lone Oak Road
Vista, California 92083
(plants . . . catalog $1.00)

Well-Sweep Herb Farm
Dept. TMEN
317 Mt. Bethel Road
Port Murray, New Jersey 07865
(plants, seeds, products . . . catalog 75¢)

White Flower Farm
Dept. TMEN
Litchfield, Connecticut 06759
(plants . . . $5.00 subscription fee for extensive catalog and other publications)

Norm Lee

This is how my wife Sherrie and I harvest fresh vegetables year round. We plant eight organic raised beds—ours are 3′ X 24′ each—in early spring . . . and succession-plant them for the fall garden. We seed eight other beds for the summer garden in May, and replant them later in the season to become the winter garden. The plan is suited for USDA Hardiness Zones 5 and 6, but can be adapted for Zones 4 and 7.

Green onions, radishes, garlic, marigolds, dill, basil, and such are interplanted throughout to deter insect pests. When it's time to plant a bed, we may pull out an old crop and add it to the compost pile before its bearing season is quite over.

OTHER GAR

WINTER SQUASH AND CORN PATCH

ALL-Y

PARSNIPS

LEEKS

HERBS

A FOUR GARDE

Norm Lee is editor/publisher of *Homestead* York 14512). Calligraphy is by Sherrie Lee.

SPRING GARDEN → FALL GARDEN

REPLANTED FOR

FEB./MAR./APR./MAY/JUNE PLANT	HARVEST	→	JULY/AUG./SEPT./OCT./NOV. PLANT	HARVEST
PEAS: An early variety such as Little Marvel or Maestro works well. Soak overnight before planting to speed germination.		→	CABBAGE: A midseason variety such as Copenhagen Market serves us well. (You can also grow cabbage in the winter garden.)	
SPINACH: Winter Bloomsdale is our choice. Tear out as necessary to make room for broccoli.		→	BROCCOLI: Johnny's Waltham 29 is our choice here, which can also be intercropped with spinach in the spring garden.	
BEET GREENS: The perfect spring green for salads and for cooking. Detroit Dark Red is just one good variety.		→	BOK CHOY: This provides great greens deservedly gaining in popularity. (It's also called Pak Choi.) We order ours from Tsang & Ma.	
LETTUCE: Black-Seeded Simpson's our favorite. Oak Leaf planted the previous November will come up super-early in spring. Try it!		→	CARROTS: Keep them watered. We like Red Cored Chantenay. Save space for some White Chinese "winter" radishes from Burpee.	
CAULIFLOWER: Thompson & Morgan's Abuntia or Stoke's Early Abundance are good and early. We also like Snow Crown and Snow King.		→	KOHLRABI: Great raw or cooked, it deserves more popularity. Early White Vienna's the best.	
GREEN ONIONS: We transplant February-started Ebenezer globes outdoors in April. On September 1, we put some in borders of the fall garden.		→	TYFON HOLLAND GREENS: This delicious cross between a turnip and Chinese cabbage is from Nichols.	
CHINESE CABBAGE: Try Burpee Two Seasons Hybrid or Johnny's Nagoda. Harvest when young and tender, before they bolt to seed.		→	PEAS: Maestro does well in fall, but we do love bush Sugar Snap's sweetness and high yield. We presoak our seed.	
TURNIP: Tokyo Cross Hybrid may be your best choice. Among the earliest, ol' Purple-Top has never failed us.		→	LETTUCE: Buttercrunch is a good choice, hardy and tasty. Putting a bit of hay over it, we can harvest it until Christmas."	

Some beds can also be interplanted before the preceding crop is entirely used up. There are many more possibilities than we've shown here.

Most important for winter harvests—after the selection of the hardiest vegetables and varieties available—is the application of deep mulch. We put 12 or more inches of dry hay over the beds before freezing temperatures begin in the fall (plastic sheeting on top keeps water out). That way, we're still eating winter crops when the spring garden starts producing its first greens. And that's a gardener's thrill!

We dry herbs and onions, can tomatoes, and store winter squash. All else comes straight from the garden . . . all year round.

SECTIONS

POTATO PATCH

BEDS

ASPARAGUS

STRAWBERRIES

JERUSALEM ARTICHOKES

SEASON
N PLAN

ews ($10 a year, Dept. TMEN, Naples, New

SUMMER GARDEN — WINTER GARDEN

REPLANTED FOR

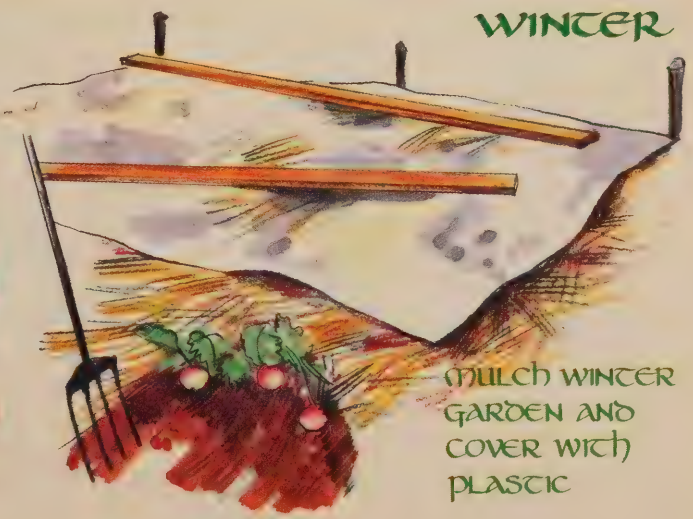
MAY/JUNE/JULY/AUG./SEPT. (PLANT … HARVEST) → AUG./SEPT./OCT./NOV./DEC./JAN. (PLANT … HARVEST)

SUMMER GARDEN	WINTER GARDEN
TOMATOES: Big Girls, widely spaced and well staked, allow room to set out the next crop in August. Prune for rapid ripening.	CHINESE CABBAGE: In early June, we plant Michihli seeds in flats. Seedlings are transplanted among tomatoes in early August.
GREEN BEANS: We like (and inoculate) Tendercrop and Blue Lake. Tear plants out without hesitation to make room for the new crop.	CORN SALAD AND LETTUCE: Sow half a bed of each. Maches Corn Salad from Nichols is tasty and productive. Oak Leaf is the hardiest lettuce.
LETTUCE: Salad Bowl and Black-Seeded Simpson are our summer favorites. Shade the maturing plants with a snow fence to preserve sweetness.	CARROTS: Agways' Hybrid Danvers has been best for our winter garden (it can last until April!). Water the plants often the first three or four weeks.
SUMMER SQUASH: Harvest crookneck or zucchini when they're young and tasty, because huge ones suck out plant energy.	TURNIPS: The best bet is Purple-Top White Globe. They're still sweet, under heavy mulch, in February and March.
SWISS CHARD: A great green! Cut it back to make room for interplanting the brussels sprouts. Fordhook's our choice.	BRUSSELS SPROUTS: Jade Cross Hybrid always produces well for us. Plenty of hay is needed to cover-mulch it!
SWEET PEPPERS: We transplant a hybrid variety when all frost is gone. Its fussy nature demands critical care.	KALE: Start seeds in June, and transplant among the peppers in August. Use young leaves in salads, mature ones cooked.
CANTALOUPE: We love Ambrosia. Gently tie vines up on trellises. Near harvest, prune vines to make room for beets.	BEETS: Lutz are extra-good for winter. Beet roots tend to get woody after January thaw, but then produce new greens.
CUCUMBERS: Here again, use several short trellises and prune the lower leaves so sun can shine on the next crop at the proper time.	SPINACH: We go with Winter Bloomsdale. Sprout seeds on paper towels and keep them well watered for first weeks in ground.

SUMMER

harvest summer squash when small

WINTER



mulch winter garden and cover with plastic

ESSENE BREAD

The ultimate in whole grain nutrition:

Of all the known breads, the simplest and possibly the most nutritious is Essene. An ancient recipe for this unusual loaf appears in the first century Aramaic manuscript entitled *The Essene Gospel of Peace* (from which the bread derives its name) . . . but, in fact, it dates back to prehistoric days when wafers made from a grain-water paste were cooked on sun-heated stones.

There's not much difference between the baking technique used by the monastic brotherhood 2,000 years ago and our modern method. Both result in a round, flattened loaf—rather like a sweet, moist dessert bread or cake—containing all of the virtues of unadulterated sprouted grain . . . its *sole* ingredient. The recipe offered below is adapted from *Uprisings: The Whole Grain Bakers' Book*, a compilation of bakers' recipes inspired by the Cooperative Whole Grain Educational Association Conference of 1980.

THE MAKINGS

To sprout your grain, you'll need a wide-mouthed glass jar (or a large plastic tub or soup pot) that has a screw-on lid with holes punched in it or a piece of fine screening, cheesecloth, or netting secured to the top with a strong rubber band. A meat grinder (or a food processor or hand-cranked grain mill), a cookie sheet, and an oven will take care of the rest.

Hard, red winter wheat is a good choice for sprouting . . . just be sure to buy uncooked, unsprayed, *whole* berries. Two cups of wheat yields about four cups of dough—enough for one loaf—so purchase accordingly.

FROM BERRY TO BREAD

Begin by measuring the desired amount of wheat berries into the sprouting jar. Soak the berries overnight, using twice their volume of water. The next morning, drain off the liquid (which is rich in nutrients and can be added to soups, drinks, etc.), then set the jar in a dark place and rinse the berries with cool water twice a day. *[EDITOR'S NOTE: The MOTHER staffer who tried this recipe found it necessary to rinse the jar four times daily . . . otherwise, the berries tended to ferment before sprouting.]* Drain the jar *thoroughly* after each rinsing, and shake it occasionally to prevent matting and spoilage.

When the sprout hairs are about twice as long as the berries and have a sweet taste (try them!), they're ready to use. This takes three or four days, depending on the temperature, humidity, and so on. Skip the last rinse before grinding so that the berries won't be too moist to use.

Next, oil the grinder parts and put the sprouts through. The resulting dough should be juicy, sticky, mottled light and dark, and rather like raw hamburger in consistency. If you think nuts or fruit would give some extra zing to the finished product, now's the time to put them in. Whatever dried fruits you plan to add should first be soaked in hot water for 20 to 30 minutes.

Ready? Now, wet your hands and take up a quantity of dough. One handful makes a nice roll, while a double handful is good for a small loaf. Work the dough briefly to get out any air pockets, then shape it into circular, somewhat flattened loaves. Place them on an oiled cookie sheet and bake them for approximately 2-1/2 hours at 250°F until the outside is firm—but not hard!—and the bottom springs back slightly after a gentle prod with the thumb. The inside will be quite soft, developing a firmer texture upon cooling. (To prevent the loaves from drying out, some bakeries spray them with water before and during baking.)

Allow the loaves to cool on wire racks and then store them in sealed plastic bags. If you're going to eat your Essene bread within three or four days, don't refrigerate it, as it will stay moister if stored at room temperature. Refrigerated, it will keep up to four weeks . . . and the bread can also be frozen.

That's all there is to it. Sprout, grind, shape, bake, and enjoy . . . one might say that it's the very essene—excuse us, *essence*—of simplicity!

EDITOR'S NOTE: Readers who would like to explore others of the more than 200 whole grain recipes offered in Uprisings *can obtain the book by writing to Uprisings Publishing Co., Dept. TMEN, P.O. Box 2755, Ann Arbor, Michigan 48106. The paperbound edition retails for $9.95, while a spiral-bound, "kitchen efficient" edition sells for $11.95. On orders of up to five copies, Uprisings will assume the cost of shipping.*

STAFF PHOTO

YOU CAN GROW HERBS!

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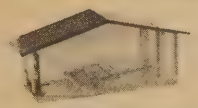

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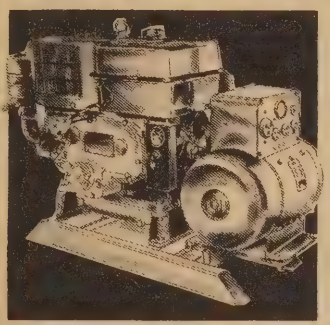

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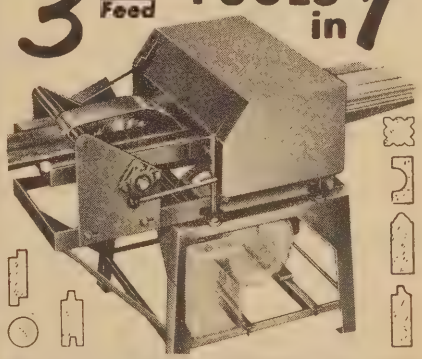

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UTILITIES ARE CHARGING CUSTOMERS BILLIONS OF DOLLARS FOR FEDERAL INCOME TAXES THAT ARE NEVER PAID, according to a study released by the Environmental Action Foundation (EAF). A law written by utility lobbyists and adopted by Congress in 1969 allows an electric company to charge its customers as if it didn't receive tax breaks. But the fact is, combined federal tax subsidies for utilities now total $5 billion to $10 billion a year. The Power Line, EAF's monthly publication (Dept. TMEN, 724 Dupont Circle Building, Washington, D.C. 20036 . . . annual subscription, $25), printed some interesting figures from the survey in a recent issue: In 1981, the nation's top 100 electric companies billed ratepayers for $5 billion in federal income taxes, but reported paying only $1.3 billion to the IRS . . . Commonwealth Edison, for example, charged its customers for an incredible $208 million in federal income taxes, but reported paying only $12 million to the IRS . . . and finally, 17 of the 100 companies surveyed reported paying no federal income taxes at all. (And 16 of those utilities were eligible for tax refunds, but continued to charge ratepayers as if they'd paid taxes. In fact, Public Service Co. of Oklahoma claimed a refund of $22.4 million, and then charged its customers $25.4 million for federal income taxes!)

A WIND-POWERED WATER PUMP THAT WORKS IN WIND SPEEDS AS LOW AS TWO MILES PER HOUR is now being manufactured by Cobden Turbines of Mildura, Victoria in Australia. The 30-bladed rotor mounted at the front of a jet engine–like air scoop is said to be a substantial improvement over conventional pumpers, which require wind speeds of at least eight miles per hour. In addition, the machine can be rotated horizontally to work as a giant defroster for protecting orchards: The blades pump higher, warmer air toward the ground to displace the cold inversion layer that usually accompanies frost.

ELECTRONIC ROAD-USE PRICING IN TRAFFIC-CONGESTED CITIES may become a reality if a pilot program planned for Hong Kong is successful. The scheme involves installing electronic identification plates in some 5,000 government vehicles . . . and burying sensors tuned to the tags beneath 30 of the city's most congested intersections. Whenever a bugged auto or truck passes over a detector, the "underground tollbooth" will send a signal to a central computer, which in turn will calculate the appropriate road-use charge (prices will vary according to the location, time, and day) and add it to the vehicle's account. If the test works, every auto and truck in Hong Kong will be equipped with the tags . . . and drivers will receive road-use bills in the mail each month.

A COAL-POWERED CADILLAC ELDORADO has been developed by GM and is housed at the General Motors Technical Center in Warren, Michigan. The auto runs on finely powdered coal dust that's mixed with air and injected into a firing chamber in small, metered amounts. The car's builders say that the vehicle demonstrates the fuel economy and power of a small conventional V-8, but there are some problems . . . namely, very slow acceleration, engine-damaging particulates, and high levels of nitrogen oxide emissions. Researchers at GM and elsewhere, however, are working to overcome those obstacles.

NUCLEAR POWER IS IN TROUBLE IN EUROPE, TOO: Spain has "indefinitely deferred" construction of five nuclear generating plants, including three that were already partially built at a cost of $2.2 billion. And in France, six planned reactors have been shelved . . . while remaining nuclear power construction in that country is expected to raise utility rates by at least 7% above inflation each year.

BOATS THAT "SWIM" LIKE PORPOISES may be in our future if a new marine propulsion system, demonstrated by engineers at the Tokyo Institute of Technology, proves popular. The scientists installed a horizontal finlike "propeller"—a 9″ X 30″ sheet of flexible aluminum with a rubber edge—on a small motorboat, and connected it to the vessel's engine with a rotary cam and pushrods that move the device up and down like a porpoise's tail. The flipper proved to be 30% more efficient than conventional propellers at speeds under six knots . . . and because it has no whirling blades, it shouldn't cause injuries.

WE'RE GETTING BETTER, BUT . . . Cambridge Energy Research Associates recently reported that more Americans than ever are conserving energy in the winter. Ten years ago, the organization says, 85% of us kept our home interiors at temperatures of at least 70°F, but today only 45% maintain such a high heat setting. And the Energy Information Administration (EIA) has also come out with encouraging news, saying that petroleum consumption in the U.S. during 1982 declined 5% . . . the fourth year in a row such a decrease has been noted. But EIA also pointed out that the average citizen today still consumes 306 million Btu each year: the equivalent of 14 tons of coal, or 53 barrels of oil, per person.

THE PEOPLE'S REPUBLIC OF CHINA is actively seeking contact with firms selling alternative-energy information and equipment, according to China Industrial Development, Inc. (Dept. TMEN, 447 West Garvey Avenue, Suite 130, Monterey Park, California 91754). . . . British inventor Alan Freeman has developed a PHOTOVOLTAIC-POWERED BICYCLE. A 21-watt solar-cell panel mounted on the handlebars drives the vehicle at speeds up to eight miles per hour in sunshine, and a standard 12-volt battery takes over on cloudy days. . . . Meanwhile, A SUN-FUELED "SOLAR CAR" HAS CROSSED NORTH AMERICA, making the 2,500-mile trip from Long Beach, California to Daytona Beach, Florida in 18 days. The auto—dubbed "Silent Challenger"—runs directly on photovoltaic-induced current and will race an Australian "solar car" across the United States this June.

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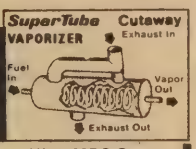

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There can be a dark side to family get-togethers . . . and a bright side to winter blizzards.

EXTENDED VS. NUCLEAR FAMILIES

Carol Bly

I have been thinking about the positive side of a Minnesota blizzard. [One] of the blessings is that extended-family occasions come to a halt. Thank goodness. The extended-family dinner is a threat to the pleasure and ease of the American farm family, yet it is hard to say so. In Minnesota we are great protectors of the American family—just as we are one of the last areas in which the small "family farm" idea works and is sacred. We are right about this. The nuclear family is far the best of all the units human beings organize themselves into; when you break it down, its members inevitably pursue lesser, not greater, aims. They settle for cheaper values. Jung says that, when the family breaks, the adult members tend to be frozen at the level of consciousness at the moment of the break. On a less subtle level, people begin following their own noses with more abandon. Experiment takes the place of solid satisfaction; satisfaction takes the place of thinking hard.

In the country, *family* means father, mother, children, and the grandparents; *extended family* would mean all the above plus the cousins, the uncles, the grownup in-laws on a lot of sides. These relations tend still to be living near one another, and often a farm couple's first five or six Christmases together will be spent in their presence.

The extended-family goals are not the nuclear-family goals; what nourishes extended-family society is starvation fare for the nuclear family. Here is how it works. If people are eccentric and verbal and curious about other lifestyles, then the extended-family dinner plus afternoon plus supper plus afterward is a cheerful, messy, engaging, affectionate business even when it does drag on all day (as it always does). But if people are shy or harassed or not perfectly confident about their accomplishments, then the extended-family holiday is informed by some misery along with the Jell-O and fruit and Rice Krispies bars.

My suspicion is that prairie families have been ruing these large, hearty, 100 percent threatening occasions for over a century now, but no one dares say anything because it sounds mean—and it does sound awfully mean to say you don't want the whole family back over this year. If you took a poll with promise of utter secrecy, I feel sure the vote would be 98 percent "We should have gathered only two times instead of four times this year because I was never so tense or bored in my life" and 2 percent "Well, Merv and LaVonne had them last year, so we figured it was up to us to have them all this year". Such remarks never get made aloud, however, because our general cultural stance in the countryside is that we wish people "neighbored" more, the way they used to, and we wish families were sticking together more, the way they used to. Who can imagine Laura Ingalls Wilder wishing the folks were not all going to show up? In other words, we are torn about this.

I will describe what works badly in big family occasions. Unlike lions and dogs, we are a dissenting animal. We need to dissent in the same way that we need to travel, to make money, to keep a record of our time on earth and in dream, and to leave a permanent mark.

For that kind of thinking and feeling we need gravity. We need a chance to be slow, turbid, and grave. Nothing could be worse for this than to be desperately busy all week, week in, week out, at hard physical work and then have a whole valuable, holy holiday taken up by an extended-family occasion. There is little chance to talk about anything. If one says, "Well, the Farmers Union has an interesting project on hand—they're bringing the humanities to nontraditional audiences," a responsible hostess is likely to respond: "Oh—if you're going to talk politics then . . ." And if one says, "You know, I often wonder what happens in that bourn from which no traveller returns—you know? I mean, what dreams'll come when we've shuffled off etc.?", a responsible hostess might say, "Oh, for morbid . . ." I don't know why it is that in large family gatherings it is morbid to discuss life after death, whereas it is good, workable smalltalk to discuss accidents involving young fathers and bailing-wire winders on their tractors, or the mutilation of cattle by some occult group.

The traditional weapon against time wasting by the extended family was the nineteenth- and twentieth-century prep, or public, school. School was valued as a higher loyalty than the family. Honoring family was a given; a sign of growing up was to have a school to honor. Country was to follow. The loyalty that would have made the young person sit around and nod politely throughout Thanksgiving, Christmas, and New Year's Day, to the cheer of Aunt LaVonne and Uncle Merv, went instead to the school, or to the Army; it is acceptable to rise from a foundering dinner of turkey with "Sorry, people, but I've an exam to study for! Wish I hadn't!" or "Sorry people, I have to pack, I'm supposed to be at Fort Bragg tomorrow!", whereas it doesn't work the other way round: no one writes Headmaster Sizer that they'll be back at Andover a few days late because Merv and LaVonne and their kids are here from Colorado Springs. And apparently guardhouses and brigs are kept in business by people who try on such explanations in the armed services.

A drawback to Midwest rural life has been our serious need to "neighbor," which has locked us into rather more of the extended-family social life than is good for us. We feel torn about this: there was something great in the coming and going of neighbors from pioneer times right up to World War II. Yet it is a terrific relief not to have these invasions—which tend to last for hours. And so we have developed some minor, peripheral social occasions which very few city people could guess at. On Sunday mornings, a couple of men spend an hour parked in one of their snow-cleared farmyards. A farmer drives his heated pickup over to the neighbor's farmyard, and waits for his friend to out and join him in the cab. They sit there for a while, warmed by the heater, listening to the calm engine. They don't want the house; the house is given over to the conventional things—preparation of Sunday dinner, going to Sunday school. They sit with some beer in the pickup. It is very important, because they are outside convention and also free of work. Another place like that, at another season, is the unused stall of the 4-H buildings at the county fair. Somehow people have found a few straw bales left, and skewed them around into a circle, and they can really talk. In the next stall the heavy Hereford stands; just looking at him you can tell it isn't enough to be *of nature*. We were meant to work out ideas. The city person who retires to country life hasn't the problem of the regular country resident: his situation is free of extended family. No one expects him to show up for New Year's Day dinner and then stay all the afternoon and then eat leftover turkey.

There are conversations that can kill: "Ja, you can sure tell there's more snow coming from where that came from" or "You're a lot safer in a jet than you are on U.S. 212, I don't care what they say."

The problem with the above remarks is not that they're untrue or dull: it is that one can't reply, "To tell you the truth, I think I'm on the other side of that one." It is impossible to dissent.

Why all the fuss about dissenting? Educators, beginning with Piaget, I think, tell us firmly that the mind literally is *changed*, evolved, by the act of conceiving a new idea. It's no longer the same mind. We all need to have this experience; so apparently we need hours and hours of conceptualizing. We have finally got it through our heads, too, that what one class of people needs, all the classes of people have a right to. It isn't just Beethoven who needs silence and gravity: it's all of us. And that means, especially for most of us who are madly moonlighting to make enough money, that it is cruel to waste our precious winter holidays with structured family gatherings.

The true good of blizzards is that Mervin and LaVonne get to stay in Colorado Springs and we get to stay at home without them. The schoolbus can't get through, so the children are home. No one can get out to work, so the adults are home. There is no conventional structure for nuclear-family-behavior-during-blizzards, so we face one another with delight and surprise. Anything gets said. The closeness, as the wind screams around the light pole and builds up its incredible drifts, which later we will tunnel, is absolutely lovely. If whoever of us, like Hamlet, should now wonder aloud how it is without the mortal coil, no one need kill that with "Oh, for morbid!" because the house is full of confidence. Dozens of times I've heard farm men and women mention how cozy it was during the storm—"We did whatever we liked; we talked a lot."

Most people have to worry about money most of the time, and then the relations dictate the holiday agenda. There is a lot of conscience in rural Minnesota, too. We stick by the cousins and uncles. So it is wonderful when the blizzards come and set us into an extraordinary situation.

Puritans need the extraordinary situation.

EDITOR'S NOTE: Carol's book Letters from the Country *is available for $13.41 plus $1.50 shipping and handling from Harper & Row, Dept. TMEN, P.O. Box 1600, Hagerstown, Maryland 21740.* ●

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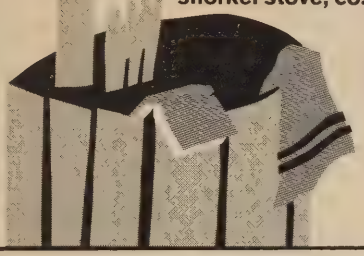

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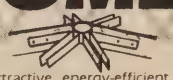

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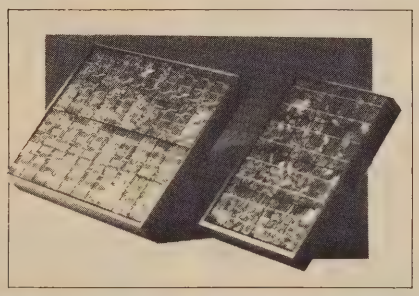

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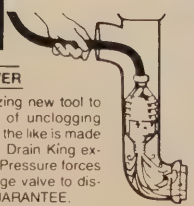

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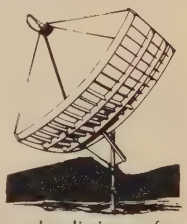

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MOTHER'S COMPOST COMMODE

It's pretty hard to deny that the common flush toilet is the easiest, most "euphemistic" apparatus yet invented for disposing of human waste. Trouble is, it's also the most wasteful: Just flip that chrome lever and—*whoosh!*—five gallons of potable water take the plunge . . . to carry away a few ounces of solid or (even more wasteful) *liquid* effluvium.

So what's the best alternative available to the growing number of environmentally minded folk who are hunting for a convenient, economical way to dispose of human waste without creating a water-squandering situation? That's the question our Eco-Village staffer Jay Herndon asked nearly a year ago when he decided to assign himself to Project Privy. His mission: to build MOTHER a good, ecological commode.

THE SEARCH IS ON

By examining and weighing the options—water-saver toilets, nonrecycling waterless commodes, and waterless waste recyclers (better known as *composters*)—Jay saw almost immediately that the all-around most sensible choice would be a composter. In addition to disposing of sewage without the use of *any* water, this improved outhouse system offers the bonus of organic fertilizer.

Once Herndon had decided on waterless waste recyclers, his next step was to look around at what composting toilets *others* had come up with, both commercially and on a homebuilt basis. He soon learned that the U.S. Forest Service in our neck of the woods was using a composter. It was a "stair-step" model, the type that requires a large—4′ X 4′ X 12′—subfloor space, and needs close to a two-year accumulation period for a batch of composted material to work its way down to the bottom, where it can then be removed. A good effort on the part of the forest service, but not what MOM's researcher was looking for.

A second model, called a "two batcher", had been tried by several local do-it-yourselfers, but it wasn't all Jay hoped for either: It required too frequent shoveling of the heap from one composting bin to another. Moreover, *both* of the units he inspected evidenced some degree of insect infestation and—you guessed it—odor.

The next step in MOTHER's search for the perfect waterless toilet was to scout out the commercial offerings. Here, the main problem was price: The average cost of commercial composters is in excess of $1,000, and such units almost always require an external source of power to provide venting and drying heat.

So, by identifying the characteristics that he wanted to *avoid*, Jay came up with a set of standards for MOTHER's composter: It should take up as little subfloor space (especially vertical) as possible . . . use no conventional power to supply heat . . . require minimal servicing and handling of waste heaps . . . produce no odors . . . be bugproof . . . and be considerably less expensive to construct than even the least costly commercial model.

THE EVANS COPROPHAGE NO. 3

Our compost sleuth now made a thorough survey of the available literature. Of the many designs for owner-built systems Jay studied, one—the Evans Coprophage No. 3 (presented in Rodale's excellent book *Goodbye to the Flush Toilet*)—seemed to make the most sense. This unit met many, but not all, of MOM's requirements, the primary shortcomings being that it offered no provision for the sanitary disposal of liquid wastes (they were simply dipped out) and that it depended on a small electric fan for venting. Furthermore, there was no heat source . . . an important, almost *mandatory*, element in any truly efficient composter.

But—despite these undeniable flaws—the overall design of the No. 3 was sound. A two-stage composting process employed a rotating basket drum that was set above a second-stage decaying shelf. So Herndon decided to adopt the model as the starting point from which he created MOTHER's very own composting toilet.

STAFF PHOTOS

FAR LEFT: Solar-heated air enters the composting cabinet via a 3″ duct, and a 12″ vent pipe assures rapid airflow for proper compost drying and odor elimination. LEFT: The interior of MOM's "little house". Notice the split-cedar shingles on the back wall, and the raised, airtight lid to the left of the seat. BELOW: Jay Herndon, the Eco-Village staffer who designed and built MOTHER's composting privy, beams proudly from the screened-in porch of his handiwork.

AN INSIDE LOOK AT MOM'S OUTHOUSE

Today, what you first encounter when you visit the final product at MOM's 622-acre Eco-Village research center is an outhouse-type structure of rough-sawn pine. In fact, if you approach the commode from the front, that's *all* you'll see. (You'd have to go around back to spot its subfloor portions, which are partially buried in the side of a hill.)

Open the door and you'll be standing inside a screened-in porch . . . a feature added to help bar bugs. An inner door, this one weathertight, opens into a fresh-smelling room that's illuminated by a small photovoltaic-powered light. A glance around reveals the source of the pleasant aroma: split-cedar shingles covering the walls. A small urinal is attached to one wall, and an outhouse-type bench with a tight-fitting lid completes the scenery. Lift the lid and you'll see a conventional toilet seat. To lessen visibility "down below", the inner walls of the composter's lower parts have been painted flat black.

Each of these touches serves a purpose. The toilet lid is airtight to keep out insects and to help maintain a rapid vent flow when closed. The urinal helps direct liquid wastewater around the drying heaps and sends it down a drain at the bottom of the cabinet . . . where it's eventually released into a small, gravel-filled subterranean leaching trench.

The wall covering of cedar shingle not only gives the interior of the privy an attractive appearance and fragrance, but also helps to fend off bugs (there's something about cedar that the little crawlers and fliers can't stand). In addition, there's a sandwiched layer of rolled fiberglass insulation between the inner shingles and the outer pine. To see more of the composter, you'll have to walk down the hill (it's not all that *much* of a hill) and around behind the privy.

The subfloor portions of the commode are enclosed within a 4′ X 4′ X 5′ poured-concrete-block cabinet, the inside of which is water- and lightproofed and—as mentioned earlier—painted black. The outside surface of the cabinet is lined with inch-thick, foil-faced insulation (if you want to get technical, it's called *polyisocyanurate*) and is finished with a coating of stucco.

On the west side of the building you'll spot a crank handle that's used for periodic rotations of the composting drum. Up the east side of the structure runs a 12″-diameter galvanized duct pipe that vents the composting cabinet to prevent odors from entering the "comfort room" when the seat lid is raised. The pipe is painted flat black to increase upward venting flow, extends high enough to exhaust its gases above head level, and is capped with a wind-driven turbine ventilator.

At the lower back of the concrete composting cabinet you'll see a 3/4″ X 2′ X 4′ plywood door that provides easy access for removal and cleaning chores. An insulation-wrapped, 3″-diameter galvanized duct pipe is vented in through the plywood access door and carries a flow of high-temperature solar-heated air into the composting chamber. That warmth comes from the flat-plate solar collector that stands just behind the privy. It has a collection area of 32 square feet and is of the inexpensive-to-build fluorescent-light-tube type. (For more on the subject, see "MOTHER's 'Fluorescent-Tube' Solar Collector" in issue 53, page 86.) Jay used this particular suncatcher because it was "just lying around" . . . but he points out that any type and any size of solar air-warmer will work, as long as it provides heated air to the composter.

As a final, high-tech (and expensive!) touch, the south-facing slope of the building's roof sports a photovoltaic panel to provide power for the interior light.

THERE'S MORE TO COMPOSTING THAN MEETS THE EYE

That's all that meets the eye . . . because the *working* components of the composter are hidden inside the subfloor cabinet. They work like so: Waste material entering the cabinet falls into the wire drum through an opening that can be closed, when necessary, via a remote lever. At intervals dictated by frequency of use—that's every couple of days at the busy Eco-Village, but would be only every week or so for a family of six—this cylinder drum gets spun around a turn or two, which shakes the fresh deposits down to the lower rack and provides aeration (oxygen is a *must* for composting).

The rotating drum is made of 3/4″ expanded-metal mesh that's coated with epoxy to prevent corrosion and to expedite the cleaning chores. Its length is just under 4′, and each end is capped with a recycled 21-3/4″-diameter hot-water-tank end. Bearing-mounted spindles, or axle shafts, are threaded into each end cap, with one spindle passing through the wall and onto the crank handle.

When waste material dries and decomposes sufficiently to pass through the drum's mesh, it falls some 2-1/2 feet to the *second-stage* composting rack. This flat "bench" is made of underlying 2″ X 4″ galvanized "hog wire" (for strength and rigidity) and covered with galvanized window screening. The fine mesh keeps all but liquids from falling through to the floor of the cabinet.

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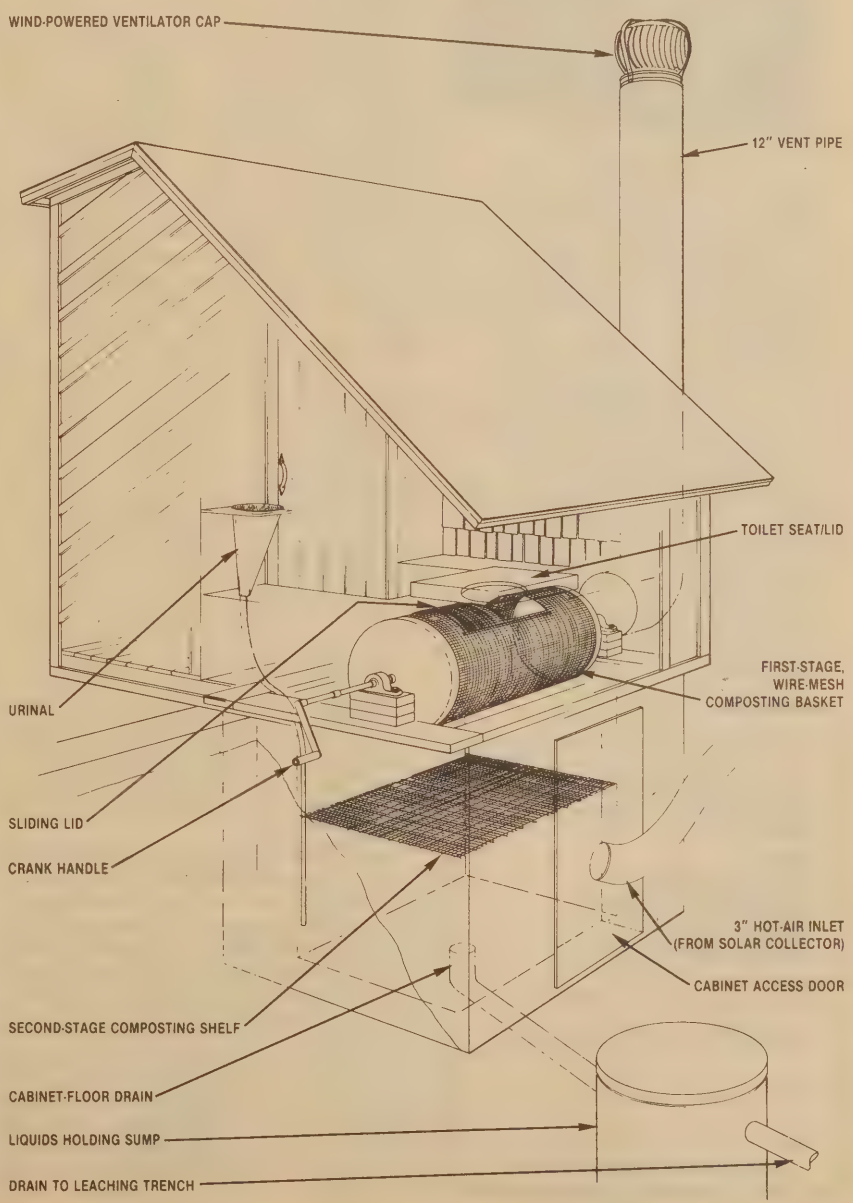

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(continued from preceding page)

Since this final-stage rack is level with the bottom of the access door, the person servicing the commode can easily shovel the dried, composted heap into a wheelbarrow outside. The hot-air vent enters just below this bottom shelf, so the heat it carries rises through *both* composting levels. (The four-to-one ratio between the 12" vent duct and the 3" heat inlet takes advantage of the Venturi principle to help insure a rapid upward draft.)

A drain set into the lowest point in the sloping floor empties liquid leftovers into a 50-gallon concrete holding tank which, in turn, feeds into the gravel leaching trench.

SERVICING REQUIREMENTS

MOTHER's composting toilet requires only minimal servicing . . . periodic rotations of the drum (a no-fuss "outside" job) plus a semiannual cleanup. For the latter chore, the cabinet is emptied, then a bucket of hot, soapy water and a long-handled brush are used to scrub down the drum, the second-stage shelf, and the interior walls and floor of the cabinet. After that, it's "Close 'er up for another six months!"

As for the human-derived compost, the fertilizer is ready to be applied to nonfood plants —lawns and flowerbeds—just as it comes from the cabinet. But if you wish to use the compost on your *vegetable* garden, you'll need to start a second, outside, composting heap to guarantee safe, complete biological breakdown . . . and, even then, it's best to apply the fertilizer *between* growing rows, and not directly on the plants. Better yet, add your composted "night soil" to your plot in the autumn, working it into the ground after the crops have been harvested.

BUT DOES IT *WORK*?

You bet it does! MOTHER's composter has been in active use for nearly a year now, and it's exceeding all expectations. The Eco-Village crew alone provides a minimum of ten visits a day in the off-season, and once our many visitors arrive, the waterless commode regularly services 30 people daily. (Over the 1983 Independence Day weekend, visitors to MOM's "little house" used 18 rolls of two-ply tissue!) And so far, we've detected no signs of waste-digestion problems, odors, or insect troubles . . . the three most common composter bugaboos.

The prototype unit has been *so* successful, in fact, that it was the first (and at this writing, still the *only*) composting commode to receive approval from our county inspector . . . and Eco-Village staffers are planning to build several more almost-exact replicas in the next few months.

Almost-exact replicas? That's right: There are a pair of minor changes Jay says he'd make next time around. The first of these modifications would be to use 1" rather than 3/4" expanded-metal mesh in the drum. He feels that the present, smaller, mesh holds material in the basket longer than necessary, and that the 1" mesh would speed composting with no decrease in efficiency.

The other change also has to do with the drum. Instead of *threading* the weight-bearing spindles into each of the end caps, Jay says he'd recommend brazing them into place, because they have a tendency to loosen a little with use.

ECONOMY TIPS FOR THE DO-IT-YOURSELFER

MOM's prototype, not including the photovoltaic panel, cost just over $400, beating the price of the least expensive commercial units all to pieces. And though Jay was able to scrounge the MOTHER-built solar collector and a few other goodies from existing Eco-Village projects, the typical do-it-yourselfer should nonetheless be able to come up with a waterless toilet that works every bit as well as ours and, quite possibly, costs far less.

How? Well, first forget about the fancy solar-cell lighting. Just hook into the existing electricity if the loo is to be an inside job . . . or use a flashlight if it's an "out" house. Then too, while *some* sort of cedar on the interior walls is recommended for its pleasant scent and bug-fighting capabilities, you don't have to use expensive closet shingles (the ones in MOM's commode ran the total bill up some $60!). Cedar fiberboard will do the job just as well . . . at a fraction of the cost. Along the same lines, fiberglass-coated, exterior-grade plywood can be substituted for MOTHER's filled-concrete-block composting cabinet, and a rust-treated oil drum could be used in place of the concrete tile for a liquids sump.

And, of course, there are far less expensive ways to build the "comfort room" itself . . . using recycled lumber instead of store-bought planks, for instance. You can certainly get by without a screened-in entry area, too.

For a good many folks, the *total* cost of the aboveground portions of the unit can be eliminated . . . simply by building the composter cabinet beneath the floor of your house and tucking the toilet itself into a convenient closet. All you need for this inside installation is a room large enough to house the facility and a minimum of 4' of vertical clearance under the floor. If you're lucky, the composting toilet will fit into the space currently allotted to your old WC. (Of course, it should be near an outside wall for easy access from below.)

So if you're tired of the wasteful habits of your five-gallon flusher and want an economical, ecologically sound waterless toilet that provides organic fertilizer as a bonus, follow Eco-Village technical staffer Jay Herndon's lead and build a composting commode. And—oh yes—if you're in the neighborhood (it's a *nice* neighborhood, really), stop by and take a peek at MOTHER's Eco-privy . . . we're proud of it!

EDITOR'S NOTE: Goodbye to the Flush Toilet—*the book that got MOTHER's technicians off on the right track—is available from Rodale Press, Dept. TMEN, 33 East Minor Street, Emmaus, Pennsylvania 18049, for the cover price of $10.95 plus $1.80 shipping and handling.*

Another excellent composting manual is Compost Toilets: A Guide for Owner-Builders, *published by The National Center for Appropriate Technology. It's available from Mother's Bookshelf®, 105 Stoney Mountain Road, Hendersonville, North Carolina 28791, for $4.00 plus $1.25 postage and handling.*

And for more good reading on the subject, why not check out the article "Alternatives to the Five-Gallon Flush" in MOTHER NO. 80, page 172?

Information concerning visits to MOM's Eco-Village can be found on page 30.

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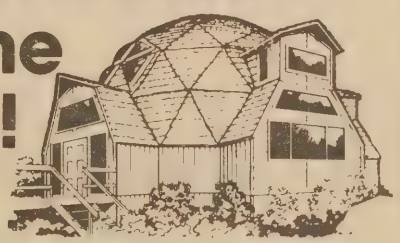

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The story behind a low-investment bootstrap business.

ARE CHIMNEY SWEEPS STILL CLEANING UP?

Jay Hensley

I'm sure most of you have seen the advertisements (in MOTHER and elsewhere) extolling the many benefits of becoming a chimney sweep. *[EDITOR'S NOTE: Longtime readers of this magazine may also recall our article on the subject, which appeared in issue 49.]* Well, *all* of the claims—the high income, the plentiful vacation time, the freedom to be your own boss and to set your own hours while you perform a useful service—can be *true*. It really is possible to write your own ticket to success and happiness as a sweep. As the editor and publisher of sweepdom's only independent trade journal, *SNEWS, The Chimney Sweep News*, I can personally attest to the rewarding careers of many "soot scrubbers".

But I also know that sweeping, like any business, has its pitfalls, too. The ads, for example, don't mention the parts about the job being terribly dirty and demanding . . . about freezing your tail off in the dead of winter (and *baking* on a hot roof during the summer) . . . about the long hours spent on bookkeeping chores and phone calls . . . or about getting bitten by a raccoon holed up in a smoke chamber with her offspring. You can spend hours scrunched in a fireplace, trying to remove and replace a rusted damper . . . there's always the risk of falling off a client's roof . . . and you may face some definitely lean times during the off-season. And as far as "freedom" goes . . . remember, that's a relative term. You may be your own boss, but your customers are your living. So when that emergency call rings in,

you grab your brushes and *go*, whether it's convenient or not!

Still, as one sweep friend of mine put it, "You don't punch a time clock. You share pots of coffee in cozy kitchens with friendly folks you never would have met otherwise. Plus, you see the world from an entirely new perspective, and there's always that anticipation as to what the day will bring."

And yes, you *can* make very good money. But the field has become highly competitive these days, so only the fittest—those with the most know-how, business sense, and motivation—survive. According to one estimate, there were only a few hundred sweeps in this country in 1977 . . . today, there may be as many as 8,000 working part- or full-time. A lot of people are jumping onto the bandwagon . . . and many of them are falling off—disillusioned and out of money—a few short months or years later.

"But it doesn't have to be that way," says former college professor and onetime chimney cleaner "Sooty" Bob Daniels, who is now a sweep-equipment wholesale supplier, as well as an instructor in business-building and advanced techniques at chimney-sweep conventions and schools. "If you look at almost any kind of small business in America," he says, "you'll find more failures than successes. But it's the other way around when it comes to sweeping. There are many more successes than failures."

WHY DO SOME SWEEPS FAIL?

Harry Richart of Hasbrouck Heights, New Jersey started cleaning flues 25 years ago. Today, he's president of the National Chimney Sweep Guild (NCSG)—the industry's major national trade organization—and, with his son, he operates a very successful business in New York City and its suburbs, extending into parts of Connecticut, New Jersey, and Pennsylvania.

Every year, Harry watches another four or five sweeps in his locale go out of business. And he can recite a whole list of possible reasons why they go under: They're not willing to work a large enough geographic area . . . they don't diversify . . . they invest too much money in equipment . . . they're not prepared for the long slack season . . . they waste money on ill-advised or ill-timed advertising . . . and/or they start out with too little capital in reserve to carry them through periods of low cash flow.

"Plus," says Harry, "a lot of these people just aren't trained or prepared for what they discover they actually have to *do* on the job. In addition to knowing how to clean stoves and flues, you need at least some knowledge of thermodynamics, along with good common sense and mechanical ability. You'll constantly run into situations that aren't covered in any manual, so you have to be able to innovate."

HAZARDS

Another part of the business that newcomers often overlook is the fact that the job carries with it a number of very real dangers.

Sweeps have been electrocuted or severely injured when their steel brushes or aluminum ladders touched power lines. Steep or icy roofs present obvious hazards (smart operators, in fact, *always* use safety ropes or a ladder with a ridge hook under such conditions). Less dangerous but still risky aspects of the work include lifting, bending, and climbing. A number of individuals have been forced to give up the trade because of chronic and debilitating strains and sprains. The wrists, hands, and back are especially susceptible to such injuries (female sweeps seem to be particularly vulnerable to these problems).

Also, creosote—a substance with which sweeps come into contact every day—contains known carcinogens . . . and the arsenic compounds that are released and deposited when wood burns are harmful, too. A recent study of 2,495 chimney sweeps by the National Board of Occupational Safety and Health in Sweden revealed that the rate of cancer of the esophagus, liver, and lungs was three to five times greater for those people than for individuals employed in other lines of work.

For your own health, you *must* take precautions to protect your skin and lungs if you work as a sweep. Gloves, a respirator, protective skin creams, and strong cleaning compounds capable of removing every trace of soot and grime from your body are all essential. If you smoke, you'll have to give it up unless you want to compound your occupational hazards with a dangerous personal habit. And if you have a beard, you probably should shave it off, since a respirator will not fit snug over your whiskers, and without a tight seal you'll surely breathe in poisons.

ON THE OTHER HAND . . .

Despite the hard work and the risks involved, most successful sweeps—including "Sooty" Bob Daniels—believe that they've found the best bootstrap business of them all. "With hard work, study, and lots of energy," says Daniels, "a new sweep can still make $25,000 to $50,000 annually within one to four years. What other business can bring you that on an investment of roughly $2,000?"

And if you happen to place more value on free time than on money . . . well, you can pretty much tailor your enterprise to give you that, too (except in the fall of the year, when you're apt to meet yourself coming and going on the rooftop).

Recently, I talked with one sweeping couple who devote most of their time to running an aggressive flue-cleaning operation in an East Coast urban area. They've been in business for four years now, and—with the help of hired crews—net between $70,000 and $80,000 a year.

On the other end of the spectrum, there's the 50-year-old sweep from rural Vermont who's content with the $8,000 that his one-man operation brings in during the fall and winter. "After the autumn rush and all those miserable emergency calls in the middle of snowstorms," he says, "I'm sick of sweeping by the time April rolls around. So I spend the spring and summer getting my firewood in, fishing, and gardening. When the leaves start changing color again, I'm ready to pick up my brushes and start all over."

Everyone, it seems, has his or her definition of "success" in the sweep business. A Long Island, New York entrepreneur, for instance, worked hard for five years and then simply retired on his earnings. And a California sweep followed a dream that many of us have had: He labored several years to build a good business, then sold the enterprise, bought an expensive sailboat, and headed for the South Pacific.

KNOW THYSELF

If you're thinking about becoming a sweep, you'll need to sit down and give some serious thought to what *you* want out of the job. And perhaps even more important, you should objectively appraise your ability to achieve that goal, given the realities of the business and your local market (does your area *need* another sweep?).

There are several factors in particular that you'll want to consider:

Motivation and commitment. Obviously, no business succeeds overnight, nor is there such a thing as a trouble-free enterprise. Be honest with yourself: Are you really willing to invest the time, money, and energy—and to undergo the physical and mental stress—involved in establishing yourself over the next several years?

Physical condition. There's no way around it: You absolutely must be in good physical shape. Many sweeps exercise regularly to build and maintain the flexibility and strength their job demands. (If you have a bad back, forget about sweeping.)

Financial capability. Although only a relatively small investment is required in this business, you *will* need enough money to pay for your equipment and to cover overhead expenses. Don't rely solely on the income you'll earn from sweeping to pay your personal and business bills . . . it'll take time to establish a self-supporting, profitable enterprise. In fact, virtually every successful sweep I've met has started out small, cleaning chimneys part-time and holding down a second job of some kind to provide funds for living and business costs over the first few years.

You'll need to buy *quality* equipment, but Harry Richart cautions against spending too much money on it. He says you should be able to get your brushes, scrapers, ladders, a top-of-the-line respirator, and a good industrial vacuum cleaner (widely available for $400 or less) for a total of $1,000 to $1,500. In addition, a truck or van is usually considered a necessity, although I know a few sweeps who work out of a compact car or a station wagon.

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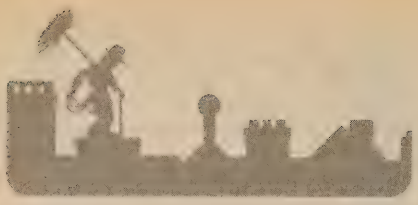

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Using your home for an office (as most sweeps do) will save you some money, but you'll still have to cope with a number of expenses that quickly add up, such as advertising in the Yellow Pages and elsewhere . . . truck or van payments . . . vehicle maintenance and fuel . . . liability insurance (don't work without it!) . . . office equipment and supplies . . . license fees . . . phone-answering services or machinery . . . clerical or assistants' salaries . . . baby-sitting . . . membership dues and workshop tuition . . . and any number of other miscellaneous costs.

Figure, too, on paying a certified public accountant to help you prepare your tax returns and set up an efficient bookkeeping system. A CPA's services may be expensive, but they'll almost always save you money in the long run.

KNOW THY TRADE

Of course, if you set yourself up as a sweep, you have a responsibility to your customers to provide professional, reliable, and *safe* service and advice right from the start. This is *not* a learn-as-you-go trade. If you don't know what you're doing, your business will last only long enough to tarnish your reputation and that of the industry as a whole. So you should be sure to do the following:

Get training before you hire out. Since at the present time almost anyone can masquerade as a chimney sweep, the future may bring federal regulations that establish industry standards and require training and licensing procedures for sweeps. Most of us would rather see newcomers impose standards of excellence on themselves *without* the need for such intervention.

There are a number of very good ways to acquire the necessary skills of the trade prior to actually setting yourself up in your own business . . . and by doing so, you'll give yourself a much better chance of competing successfully once you do enter the marketplace.

[1] Embark on a do-it-yourself training program until you feel competent to "turn pro". (One female sweep I know practiced on her own flue and those of her friends—with a brush in one hand and an August West training manual in the other—for several months before opening her business.)

[2] Apprentice yourself to an experienced sweep. You probably won't make much money—if any—during this time, but the experience will be invaluable.

[3] Hire on with a company that trains its own sweeps.

[4] Attend a special chimney-sweep training school (see the sidebar "Training and Certification Programs").

Participate in industry workshops, seminars, and other programs.

To further your education as a sweep, make it a point to take advantage of the many ongoing programs sponsored by various businesses and trade organizations. Many sweeps have told me that just one good seminar or workshop is worth a year in the field when it comes to improving technical skills, business savvy, and morale . . . so don't miss such opportunities!

One good source for such "continuing education" is the National Chimney Sweep Guild. Formed in 1977, this organization works to promote the industry, educate solid-fuel users, and upgrade the skills of American chimney sweeps. The NCSG makes available to members and nonmembers alike an excellent certification program . . . an annual convention at which many workshops are conducted . . . and technical advice by phone. It also offers its members liability and medical insurance at group rates.

Of course, a lot of people get into the trade by buying "package" systems—which include educational materials as well as equipment—from August West or Black Magic (both companies are listed in the sidebar "Training and Certification Programs"). These two firms make most of their profit on sales of initial packages, yet both make good follow-up efforts to see to it that "their" sweeps succeed. Black Magic holds an annual advanced seminar at its headquarters in Stowe, Vermont and conducts regional sessions from time to time. And August West sponsors workshops (for its customers only) all across the country. In fact, no matter where you live in the U.S., during the past year there was at least one August West seminar within a day's drive from you.

Finally, three North Carolina soot scrubbers are also holding a series of "Sweep's View" weekend workshops throughout the country this year. Call Cindy Tomain, Brenda Sanders, or Pete Luter at 704/243-1209 for more information . . . or check for their listing in *SNEWS*.

A "SOOTABLE" TRADE FOR WOMEN

It's an unfortunate fact that many women who work hard to learn and enter the labor trades encounter persistent prejudice and outright harassment from many of their male counterparts. Female sweeps, *however, rarely catch any flak from their co-workers, employers, or customers.*

In fact, the industry already proudly claims several hundred female members who are working without the hassles that they'd be likely to encounter in blue-collar trades dominated by men.

Joni Panciera, a former kindergarten teacher who now runs her own highly successful three-year-old sweep company, says, "Women who are sweeps have it made compared with those who are pipe fitters, fire fighters, and the like." When Joni attended the first national Women in the Trades Conference in Oakland, California last May, she was appalled by the seemingly endless stories of other participants . . . accounts of sexual harassment, physical abuse, intentionally unsafe or inadequate training procedures, ridiculously long "apprenticeships", and more.

Linda Strohacker, who signed on with Magic Sweep Chimney Sweeps in Virginia Beach, Virginia last summer, is another woman sold on the occupation. An experienced electrician, she'd been out of work for five months (and, as a union member, couldn't solicit her own jobs), so she decided to try sweeping . . . and during one blistering hot summer sailed through a rigorous apprenticeship with flying colors.

Like Joni, she stays tough and strong by working out at her local spa. "When I started sweeping," says Linda, "I was already used to climbing ladders and carrying heavy equipment. My wrists were strong. But I did get stiff and sore from sitting cross-legged on hearths, and my right hand hurt after a long day's work. I'm building up my stamina now so that I don't come home dragging anymore. I have my good days and my bad days, but I like it."

Several women have become leaders in the industry. Eva Horton, a woodstove dealer in Maine, was a prime organizer and the first president of the National Chimney Sweep Guild. Elaine Edwards is executive director of the NCSG . . . former sweep Sue Fine is the guild's communications director . . . and Dee Stoll heads the Chimney Sweep School of America.

"Sweeping is still in its infancy in this country," says Dee, "but it has great potential for men and women enterprising enough to make a go of it."

EDITOR'S NOTE: Another woman who is an important mover and shaker in the industry is the author of this article, Jay Hensley: She's the editor and publisher of *SNEWS, The Chimney Sweep News.* Jay's fine ten-times-a-year publication is available for $30 annually . . . send your order to *SNEWS*, Dept. TMEN, P.O. Box 124, Wilmore, Kentucky 40390.

Read everything you can about your trade. Build up a reference library on chimney and fireplace construction, firewood, and related subjects. Learn the local, state, and national fire codes that apply to chimney and stove installations. And subscribe to as many solid-fuel trade journals (*Wood 'n Energy, Alternative Energy Retailer, National Energy Journal,* and *SNEWS, The Chimney Sweep News*) as you can. The National Chimney Sweep Guild publishes *SWEEPING* every month for its members. And both August West and Black Magic mail useful newsletters to those who train under them or purchase their equipment.

SOME SECRETS TO SUCCESS

Diversify. Most sweeps today agree that the major opportunity for success—and a key to survival during the off-season—lies in offering a wide variety of services.

"You may work 12 to 15 hours a day during the busy season and make good money," says "Sooty" Bob Daniels, "but if you don't do more than just swab flues, you can starve during the rest of the year."

As a result of that situation, America's sweeps are evolving into virtual solid-fuel technicians! In addition to cleaning chimneys, many are now offering their services as masons, sheet metal workers, flue relinders, stove installers, safety inspectors, energy-efficiency consultants, and all-around troubleshooters. Moreover, a number of sweeps sell stove accessories and the like.

Get a partner or an assistant. Although a lot of sweeps run perfectly successful operations on their own, you should at least *consider* getting some help . . . particularly if your business is full-time or covers a large territory.

Harry Richart thinks sweeping definitely works best as a two-person (or more) enterprise. "You can give better service, and you have more time to talk to your customers, explain things, and sell them other services and accessories," he says.

And remember that sweeping is one of the best husband-and-wife bootstrap businesses in the country.

Make yourself "visible". Few sweeps who are just starting out can afford much advertising . . . but the very nature of the trade—the tradition, the old-timey top hat and tails, and the long-established mystique behind chimney sweeps—makes it fairly easy to get free publicity and word-of-mouth promotion. When Anthony Bierly of Winona, Minnesota, for example, goes into a new area to offer his skills, he heads straight for the local newspaper office . . . and there's usually a story about him in the next edition.

There are other enterprising ways to become known, too. Set up a booth at your county fair. Get to know the community's fire department personnel. Wear your top hat and tails in local parades. And once you feel secure in your knowledge of the subject (and in your ability to communicate that know-how), offer to speak to school classes and community groups about fire safety.

THE FUTURE

There's no doubt that this business has seen a lot of changes since those first heady years in the late 70's when becoming a sweep was both a novel idea and—seemingly—a wonderfully easy way to make money. The past several years have taught us to be more realistic and have sharpened our skills, widened our range of services, and

strengthened the industry as a whole. Indeed, chimney sweeps are fast becoming an important symbol for home fire safety.

Some sweeps do have doubts about the future of the trade, though.

"As the stoves get better, combining elements of the Russian fireplace with catalytic combustors, there'll be less soot to sweep," says Neal Singer of Albuquerque, New Mexico. "The burn will be cleaner. Simpler methods of cleaning will be developed, too . . . perhaps a chemical that really works—at long last!—or a simple built-in mechanical device."

Will those inevitable developments spell the end of the top-hatted, free-wheeling, heel-clicking sweep in this country?

Well, opinions vary, of course . . . but the consensus seems to be that—although the market for sweeps may eventually stop *expanding*—the trade itself will probably just adapt to the changes. One thing's for sure, people still light up when they see a top-hatted soot scrubber. And I, for one, believe that anyone who masters the skills and business savvy of a modern-day sweep-turned-technician *and* combines them with the fun and pizzazz of the traditional tuxedoed chimney dancer is likely to reap a very rewarding future.

Sweep's luck to you all!

TRAINING AND CERTIFICATION PROGRAMS

There are a number of excellent programs designed to give would-be sweeps a basic familiarity with the trade and/or to further educate experienced "solid-fuel technicians".

In addition, certification programs incorporating standardized testing are available to give sweeps an opportunity to establish professional credentials. (A growing trend among insurance companies, in fact, is to accept only certified sweeps!)

TRAINING

August West Systems, Inc. (Dept. TMEN, 187 King's Highway Cutoff, Fairfield, Connecticut 06430, phone 800/243-5166 or, in Connecticut, 203/333-1244) sells package systems including basic equipment and educational materials. To customers who have bought packages, AWS offers training at its national headquarters and in regional workshops.

Black Magic Chimney Sweeps International, Inc. (Dept. TMEN, Route 108, Stowe, Vermont 05672, phone 802/253-4867) sells package systems including basic equipment and educational materials. The company also sells individual tools and holds intensive training programs at its headquarters and regionally. Tools and training are available regardless of whether or not you've purchased the package system.

Chimney Sweep School of America, Inc. (Dept. TMEN, 301 North Swift Road, Addison, Illinois 60101, phone 312/893-3420) offers an intensive two-week, 88-hour training curriculum. CSSA is an official part of the state-approved DuPage Area Vocational Education Authority.

The New England School of Chimney Sweeping (Dept. TMEN, Box 357, Williamsburg, Massachusetts 01096, phone 413/584-5971) conducts intensive three-day training sessions including on-the-job and classroom experience, and is licensed by the State of Massachusetts Department of Education.

Oakenshield Chimney Service, Inc. (Dept. TMEN, East 3007 Providence, Spokane, Washington 99207, phone 509/484-2046) sells package systems including basic equipment and on-the-job training. Tools and training are available individually, as well.

CERTIFICATION

The National Chimney Sweep Guild, Dept. TMEN, 579 Daniel Webster Highway, P.O. Box 1078, Merrimack, New Hampshire 03054. The NCSG's certification program is widely considered the industry's competency standard, and is available to members and nonmembers. Participants work with an extensive study manual and take a thorough, supervised written exam—either Level 1 (basic) or Level 2 (advanced)—at a regional testing center.

The Independent Safety Commission, Dept. TMEN, Box 1674, St. Cloud, Minnesota 56302. The ISC also provides a study manual and conducts testing (in most cases, at the same sites and times as the national guild's exams). NCSG-certified sweeps who undergo this additional program can become independent ISC safety inspectors, earning money performing inspections for insurance companies, fire departments, local building code authorities, and related agencies.

There is also a stove installer's *certification, sponsored by the Woodheating Alliance. Write WHERE, Dept. TMEN, 1101 Connecticut Avenue N.W., Suite 700, Washington, D.C. 20036.*

EDITOR'S NOTE: All of the organizations listed above offer free information on their services. MOTHER asks you to send $1.00 with each request to help offset postage and handling costs.

FRIENDS OF THE EARTH

WATT WAS WRONG

Secretary of the Interior James Watt, the Reagan Administration's answer to comedian Don Rickles, finally put his foot in his mouth once too often. As nearly everyone knows, when Watt called his coal-leasing commissioners "a black, a woman, two Jews, and a cripple", Congress called for his resignation.

Like an evil wind that leaves a trail of torn and troubled landscape in its path, Hurricane Watt's legacy will be with us for years to come. Long after his simplistic partisan views and outrageous verbiage have faded from memory, environmentalists—the people whom the Secretary dubbed a "left-wing cult"—will still be working to right Watt's wrongs.

Under James Watt, federal lands were thrown open to exploitation, auctioned off for development, or even suggested as convenient dumping sites for toxic materials and nuclear wastes. Some of the damage the man has wreaked is irreversible . . . but other battles continue to rage.

Environmentalists' efforts to corral an oil and gas drilling stampede in U.S. coastal waters is one struggle that won't halt with Watt's departure. H.R. 3864 will, if passed, protect the California and New England coasts from drillers until the year 2000. And the continued wrestling match over coal leasing—the issue that proved to be the Secretary's undoing—has heightened public and congressional interest in federal land-use practice.

In April 1982, Watt tripped the alarms when he sold 1.6 *billion* tons of publicly owned coal in Montana and Wyoming for only 3-1/2 ¢ per ton. At the time, America's "real estate agent" bragged that he was about to lease more coal in one year than had been let out in the previous 62 years. This past September 20, however, the Senate repudiated him by passing the Bumpers-Jackson coal-leasing moratorium by a two-to-one margin. Typically, the Secretary responded by accusing the Senate of lacking the "resolve" to "defend freedom throughout the world".

No, James Watt will not be missed.

WATT'S NEXT?

Columnist George Will offered what may prove to be the best epitaph for the former Secretary of the Interior. "There are only two things wrong with Jim Watt," Will cracked, "his style and his substance." But while Watt is now out of style in Washington, his substance remains.

The successor to the Department of the Interior's top chair, William Clark, originally promised "no change" in the department's current policies. In addition, the strongest qualification that Mr. Clark can claim is that he's a rancher. (Need we mention that President Reagan owns a ranch, too?) Still, lately he has been inviting critics from environmental camps to drop by and talk things over.

Clearly, William Clark will bear close watching.

RUCKELSHAUS ARREST

A new face is certainly no guarantee of a new policy. Remember when William Ruckleshaus was loudly applauded as the white knight who would redeem the Environmental Protection Agency (EPA) from the scandals of the Ann Gorsuch-Burford/Rita Lavelle era? Following a cry of alarm in July from the National Academy of Sciences that the acid rain threat needed immediate attention, the new EPA Director promised a plan of action by September. On October 24, Ruckleshaus made his announcement: The recommendations were being put off "indefinitely". Whoops . . . the administration that had promised the new director a "free hand" in "cleaning up the EPA" had just decided to slap on the handcuffs!

UMBRELLA ORGANIZATION

Taking a more active stance on the same issue, 50 people from 40 U.S. and Canadian organizations met for four days in Grand Portage, Minnesota in mid-September to form the U.S. Acid Rain Network. Members include farmers, soil and water conservationists, Native Americans, environmentalists, and people from the fishing and tourism industries. The network plans to issue *Damage/Solution Reports* "adaptable to every region of the country" as well as "a nice long list of jobs that individuals and organizations can do to address the problem". For more information, contact The North American Water Office, 1519-A East Franklin Avenue, Minneapolis, Minnesota 55404, 612/872-1097.

DIOXIN: A BURNING ISSUE

Though they may help rid city dumps of trash overloads, municipal incinerators may also be filling city air with deadly dioxins. This warning comes from EPA researcher Dr. Michael Gross, who claims that urban trash burners may be the *second* largest source of the deadly compound in the nation. In one incinerator in Texas, for instance, Dr. Gross found dioxin levels in fly ash that were 45 times greater than the established EPA "safe" levels.

Gross was forced to go public with his findings when the information was censored from the EPA report he prepared.

NUKELY ERRORS

The year 1982 was a particularly busy one for paper pushers in the nuclear power industry . . . because power plants spent a lot of extra time reporting to the Nuclear Regulatory Commission (NRC) on more than 4,500 safety mishaps. Ten plants chalked up impressive scores of over 100 mishaps each. And 250 of the year's incidents were called "particularly significant" events. (This description refers to such "occurrences" as the near misses that could have led to meltdowns at North Carolina's Brunswick 2 and New York's Salem 2 power plants.) Half of the reported problems were laid to equipment failure, 20% to design flaws, and more than 25% to human error. Meanwhile, the number of workers exposed to measurable amounts of radiation in U.S. power plants jumped to 84,322 . . . a 113% increase over that for 1969. *[EDITOR'S NOTE: It should be pointed out, however, that—according to the DOE's Monthly Energy Review—electrical production from nuclear power increased more than 200% during the same period.]*

HOT COUTURE

With a short announcement in the *Federal Register*, the NRC recently shut the lid on importation of cloisonné jewelry. It seems the agency has found that uranium salts traditionally used to color the enameled adornments could expose wearers to as much as 4,000 millirems of radiation annually. The result, the NRC calculated, could be two million cases of skin cancer each year!

Unfortunately, though, while uranium-enriched jewelry is now unimportable, *thorium*-bearing cloisonné isn't affected by the ruling . . . nor are the hot-uranium adornments *already* in use in this country.

ORGANIC FARMING BLOCKED

The laudable Agricultural Productivity Act (H.R. 2714 and S. 1128) that we've reported on in previous issues of MOTHER has fallen on hard times. Secretary of Agriculture Block's department continues to stonewall attempts to encourage the pesticide-free farming the bill advocates. The so-called "Organic Farming Act" would establish pilot research programs on organic agricultural practices and has received strong bipartisan backing in both houses of Congress. (The bill currently has 65 sponsors in the House and 16 Senate backers.) In fact, the *only* opposition seems to come from the department Block heads!

Congressman James Weaver, angered by what he called "zealous efforts to defeat" the bill, wrote Block a letter complaining that "the USDA's determined opposition to the Agricultural Productivity Act is both shocking and confusing". An avalanche of letters to the President and members of Congress could help break the Reagan Administration's "Blockade".

EDITOR'S NOTE: The worldwide organization called Friends of the Earth is one of the most effective environmental groups in existence today, and the activities of FOE—along with a broad range of other news concerning ecological developments—are described each month in its publication titled Not Man Apart. *You can become a member of Friends of the Earth, and receive the excellent tabloid, by sending $25 ($100 for sponsor, $1,000 for life, $12 student/low income)—or $15 for a subscription only—to FOE, Dept. TMEN, 1045 Sansome Street, San Francisco, California 94111.*

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THE BARE-BONES, MAKE-DO WOOD LATHE

For most of us, establishing an effective home workshop is a matter of patiently purchasing equipment over a long period of time. True, new hand tools can ordinarily be acquired quickly, but larger, table-mounted machines are enough of an investment to send the amateur craftsperson off to garage sales in desperate quest of a secondhand bargain.

Consider the wood lathe: The basic models cost more than $300, and even a *used* piece of equipment commands nearly that price . . . yet the tool is so versatile that it's usually one of the first to find a place in the serious wood shop. Fortunately, a garden-variety lathe—without a lot of fancy features—is such a perfect example of straightforward design that an amateur toolsmith ought to be able to assemble a bargain-basement duplicate all on his or her own. To prove just this point, MOTHER's researchers Dennis Burkholder and Robyn Bryan tackled the task and came up with the bare-bones, low-budget wood lathe you see here.

WOOD YOU HAVE GUESSED?

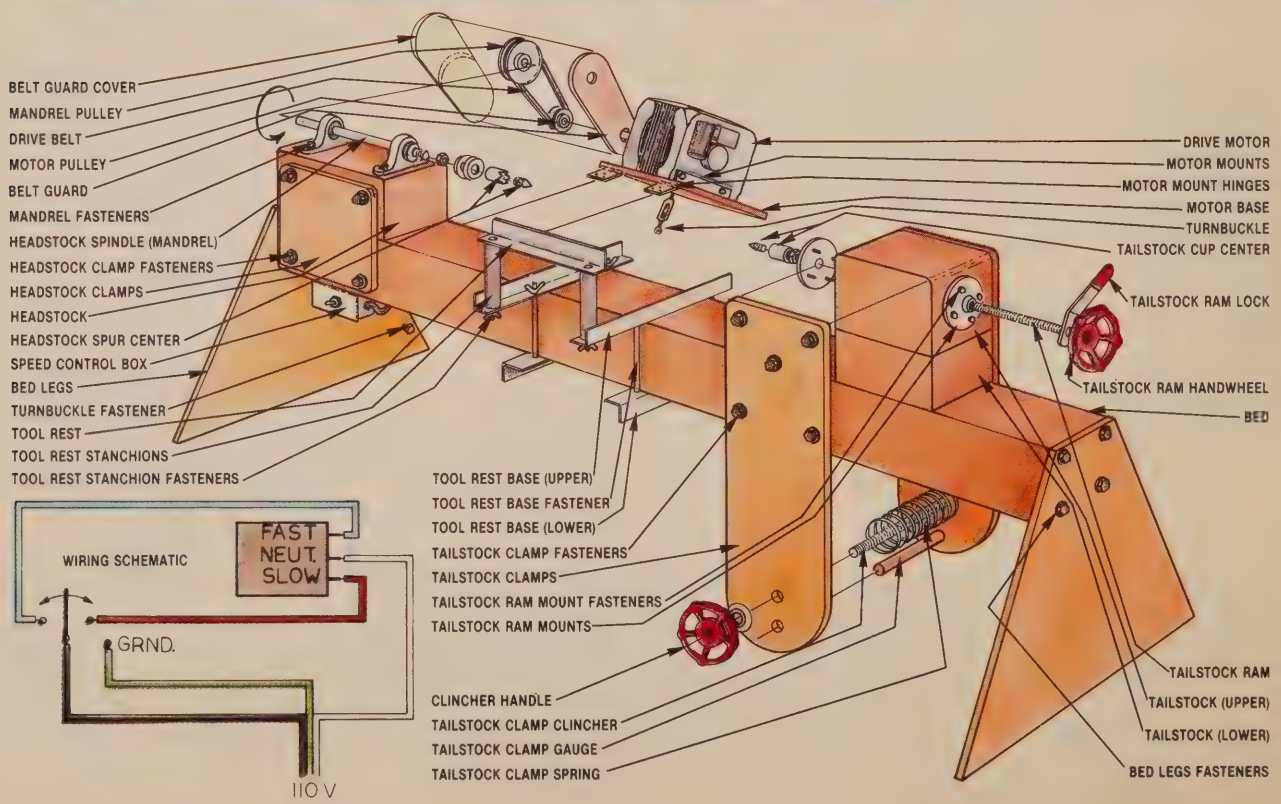
At first glance, the fellows' rustic interpretation of the familiar machine tool appears to be little more than a toy. But a few of our staffers with some woodworking experience to their credit have put the lathe through a number of trials, and the consensus is that the timber-framed woodturner is fully capable of handling most of the basic shaping and finishing jobs encountered by the casual crafter . . . at least until he or she can afford a more conventional machine.

As you can see from the photos, our budget lathe's bed is just a length of pressure-treated 4 X 4 supported by two short 3/4″-plywood legs (we recommend treated lumber for the 4 X 4, because it's generally heavier and truer than its unprocessed counterpart). The headstock consists of a bearing mandrel mounted on a 4 X 4 spacer, and the tailstock is similarly arranged . . . except that its center is fastened to a threaded-rod ram equipped with a handwheel. The headstock spindle is driven, through a V-belt, by a two-speed washing machine motor . . . and the tool rest is an adjustable framework of slotted steel angle clamped to the bed.

Just to see how much the lathe's component parts would come to if everything—excluding the motor, which was a used one—were bought right off the hardware store's shelves, we itemized its every piece and came up with a grand total of $57.16. However,

STAFF PHOTOS

LEFT TO RIGHT: Spindles—such as this table leg—up to 30 inches long can be turned down accurately. . . . By installing a faceplate and moving the tool rest, you can make bowls, too. . . . It may not be high-tech, but it's perfectly functional.



since Dennis and Robyn actually assembled the tool largely from odds and ends around the shop (a feat that probably wouldn't be all that difficult to duplicate in your own workspace), the entire lathe lightened our till by only $35 or so. Of course, the motor drive—if purchased new—would run at least $50. But it's easy to salvage a working unit from a retired clothes washer instead (ours cost a mere $10).

LAUNDRY-ROOM LARCENY

If you're interested in putting together your own low-buck lathe, you'll first have to come up with a 1/2-horsepower, two-speed washing machine motor with a clockwise rotation (looking at it from the shaft end). Our split-phase model, taken from a Whirlpool, spins at 1,725 and 1,140 revolutions per minute (RPM), though a similar *reversible* motor with dual-speed capability (found in some Norge, Speed Queen, Whirlpool, Kenmore, and Maytag washers) would work as well, providing you wired it to spin in the correct direction. Other major parts you'll need to acquire are a bearing mandrel with 1/2" arbors . . . a straight, 6', pressure-treated 4 X 4 . . . and pulleys to fit the motor and mandrel shafts that will yield a step-down of between 2/3 and 3/4 speed. (Our 2" motor pulley drives a 3" mandrel wheel, so our step-down factor is .666, or 2/3.)

Once you've collected these key components, you can scrounge, make, or buy the remaining parts called for in the list of materials . . . and proceed to assemble the bed. The 3/4"-plywood legs are simply glued and lag-screwed to the ends of a 4' section of your 4 X 4, and the motor base is hinged from beneath the bed in what will be the lathe's left rear corner. At this point, you can cut what's left of the 4 X 4 into one 8-1/4" and two 6" lengths, and glue the longest of those pieces to the top of the bed at the motor end to serve as a headstock. Two headstock clamps—made from 3/4" X 5-1/2" X 7" hunks of plywood—hold that block to the bed on each side.

The bearing mandrel bolts directly into the surface of the headstock, perfectly parallel to the length of the bed and in such a way that its tips completely clear the ends of the stock. With the larger pulley temporarily placed on the mandrel shaft, you can then position the motor for mounting by using the angle brackets, smaller pulley, and estimated belt length as your guides.

Once the motor's fastened to the hinged platform, it's a simple matter to select and install a drive belt of the proper length. Afterward, a small eye-and-eye turnbuckle can be bolted between the plywood base and the leg below it to provide incremental adjustment as the drive belt stretches. But don't just leave it at that: A belt guard—made from an oblong-cut piece of 1/4" plywood, with appropriate holes created for the motor and mandrel shafts—ought to be glued and tacked to the end of the headstock . . . and a suitable cover (we used a two-liter plastic soft-drink bottle that was cleaved and then overlapped in the middle) should be similarly fastened to the edges of that wooden plate. Finish up the drive system by shielding the motor with a cardboard cover screwed to its base . . . wiring its leads through a single-pole, double-throw toggle switch as shown in the accompanying schematic . . . and mounting that two-speed control in a standard switch box hung beneath the bed.

A TALL TAIL

To allow the lathe to accept spindles of varying lengths, the tailstock must be able to slide along the bed and lock in any given position. We provided for this by mounting elongated plywood clamps to the glued together tailstock blocks and then using a simple bolt-and-wheel to pinch the bed between those grips. A compression spring sandwiched inside the cinch and around the bolt pushes the clamps open, and a simple tension gauge (made from a length of 1/2" dowel attached to one clamp and passed through a hole in the other) indicates the degree of grip.

The tailstock ram is nothing more than a 1/2" X 9" section of threaded rod held to the stock with two 1/4" floor flanges. We first tapped these mounts to accept the rod's 1/2-20 thread, then bored a 3/4" hole through the 6"-long upper tailstock block 1-5/16 inches below its top surface and centered between its two sides. The lower tailstock block, whose dimensions should be approximately 2-3/8" X 3-1/2" X 6", dictates the height of the tailstock center, though the oversized ram hole allows for a lot of fine adjustment. Of course, your ultimate goal here is to set the head- and tailstock centers on an equal plane for accurate turning, so you may have to alter the given dimensions slightly to match the height of your particular mandrel's center.

When the floor flanges are bolted in place over the tailstock hole with the ram installed, you can attach the ram lock and handwheel. The lock is a piece of 1/8" flat stock drilled and tapped to match the threaded rod and offset to form a convenient handle. The tailstock ram wheel is, like that of the clamp, just a

(continued on next page)

LIST OF MATERIALS

	MATERIAL	PURPOSE
	1/2-horsepower, 2-speed motor, clockwise revolution	drive motor
(2)	14-gauge, 1" X 1" X 5" slotted steel angle	motor mounts
	2"-diameter, 1/2" bore, size A pulley	motor pulley
	3"-diameter, 1/2" bore, size A pulley	mandrel pulley
	1/2" X 26" V-belt	drive belt
	5/8" X 12" bearing mandrel w/shims and 1/2" arbors	headstock spindle
(4)	1/4" X 1-1/4" lag screws	mandrel fasteners
(2)	3" butt hinges	motor base hinges
	110-volt, 15-amp single-pole, double-throw switch (ON-OFF-ON)	speed control
(4)	1/4" X 1-1/2" bolts w/nuts and washers	motor mount fasteners
(4)	1/4" X 1" bolts w/nuts and washers	hinge fasteners
(6)	1/4" X 1" lag screws	hinge fasteners
	No. 8-32 eye-and-eye turnbuckle (3-3/8"-to-4-5/8")	V-belt tensioner
	1/4" X 1" lag screw	turnbuckle fastener
	1/4" X 1-1/4" bolt w/nut and washer	turnbuckle fastener
	3/4" X 6" X 7" plywood	motor base
	11" X 23" cardboard sheet	motor cover
(2)	NO. 4 X 1/2" panhead sheet metal screws	motor cover fasteners
	1/4" X 4-3/4" X 14" plywood	belt guard
	2-liter soda bottle	belt guard cover
(2)	3/4" X 3-1/2" X 11" X 14" plywood	bed legs
(8)	1/4" X 2" lag screws	bed leg fasteners
(2)	3/4" X 5-1/2" X 7" plywood	headstock clamps
(8)	1/4" X 1-1/2" lag screws w/washers	headstock clamp fasteners
	single switch box, standard	speed control box
	14-gauge, 1" X 1" X 4-1/2" slotted steel angle	speed control box mount
	3-1/2" X 3-1/2" X 8-1/4" 4 X 4	headstock
	1/4" pipe coupling w/1/2" X 3/4" bolt tip	headstock spur center
(2)	3/4" X 6" X 14" plywood	tailstock clamps
(10)	1/4" X 1-1/2" lag screws w/washers	tailstock clamp fasteners
	3-1/2" X 3-1/2" X 6" 4 X 4	tailstock (upper)
	2-3/8" X 3-1/2" X 6" 4 X 4	tailstock (lower)
	1/2" X 6" carriage bolt (1/2-13 thread)	tailstock clamp clincher
	1" X 5" compression spring	tailstock clamp spring
	3-1/16" valve handwheel	tailstock clamp clincher handle
	1/2" X 5-1/2" dowel	tailstock clamp gauge
	3/4" X 1-1/4" X 2" plywood	tailstock clamp gauge head
	1/4" X 2" carriage bolt	tailstock clamp gauge head fastener
	1/4" pipe coupling w/1/2" X 3/4" bolt tip	tailstock cup center
	1/2" X 9" threaded rod w/locking nuts (1/2-20 thread)	tailstock ram
	1/8" X 7/8" X 4-3/4" flat stock	tailstock ram lock
(2)	1/4" floor flanges	tailstock ram mounts
(8)	1/4" X 1" lag screws	tailstock ram mount fasteners
	2-3/4" valve handwheel	tailstock ram handwheel
	3-1/2" X 3-1/2" X 48" 4 X 4	bed
	14-gauge, 1" X 1" X 9" slotted steel angle	tool rest
(2)	3/4" X 3-1/2" electrical metallic tubing	tool rest stanchions
(2)	1/4" X 4-1/2" carriage bolts w/wing nuts and washers	tool rest stanchion fasteners
(2)	14-gauge, 1" X 1" X 8" slotted steel angle	tool rest base (upper)
(2)	14-gauge, 1" X 1" X 5" slotted steel angle	tool rest base (lower)
(4)	1/4" X 4-1/2" carriage bolts w/wing nuts and washers	tool rest base fasteners

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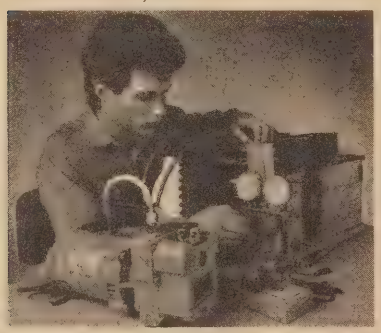

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valve handwheel redrilled and given a set of threads. A 1/2" nut torqued against it prevents it from turning on the ram.

Any kind of spindle-turning requires spur and cup centers to hold the work between the head- and tailstocks. We made inexpensive ones out of pipe couplings and bolts by cross-cutting teeth into one end of a 1/4" pipe coupling, and rethreading that and an unaltered fitting to accept the ram and mandrel studs. We then obtained matching bolts and—after cutting their heads off, slotting their bodies, and grinding their tips to a point—ran them through the cores to create both a headstock spur center able to grip and spin a billet and a tailstock cup center adequate for holding it in true.

Faceplate-turning, on the other hand, calls for a flat-surfaced fitting that screws directly to the end of the mandrel and is able to hold a workpiece by itself. We found that various-sized floor flanges that were bushed and rethreaded to fit the driven shaft served that purpose well.

Last but not least, the lathe needs a tool rest. We'll admit that our simple example could be improved upon without adding a whole lot of expense to the project . . . but the elementary rest we settled upon does function well if it's tightened properly. It's merely a piece of slotted steel angle that's supported on two 3/4" conduit posts . . . which in turn are bolted to adjustable clamps fabricated from unequal lengths of the same perforated material that's used for the rest itself. Sections of angle iron of a similar size would also work, but you'd have to drill a series of holes through their flats to accommodate the various-sized workpieces you're likely to encounter while using the machine. In either case, every metal edge should be filed smooth to prevent accidental cuts while you're working or resetting the tool rest.

LOOK BEFORE YOU LEAP

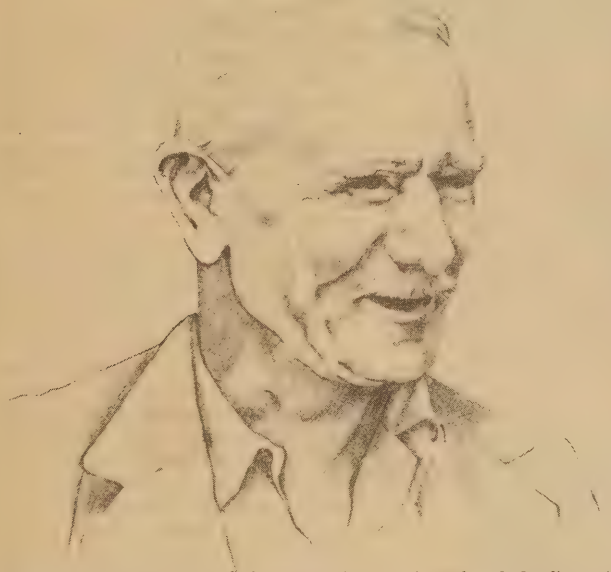
Before you "fire up" your assembled unit, remember that, although this tool only cost about a tenth of what a commercial model would, its 1/2-horsepower motor makes it just as powerful. So take the time to bolt its legs permanently to a solid work platform, and always wear eye protection (but *never* loose clothing, belts, or jewelry) when turning. In addition, make certain that the work revolves toward you, and check to see that each billet will clear the bed and tool rest by rotating it once by hand prior to engaging the motor. (The maximum swing with both faceplate and spindle turnings is 4-1/2 inches, and the distance between centers can be up to 30 inches.) Moreover, always use sharp chisels, and rough out your raw billets at the *slowest* speed . . . then switch up to high RPM for finer work. The speed ratio mentioned earlier will yield 760 and 1,150 RPM with a two-speed motor.

If you're a wood-turning novice, you'd also do well to research the craft before cutting (Sears, Roebuck & Co. markets a book titled *Power Tool Know How*, Catalog No. 9-2918 in their Craftsman line, that covers the use of many table tools). Even if you're an old hand, remember to be cautious around your equipment. After all, *common sense* is the first tool any craftsperson should rely upon.

NOTE: If you prefer not to cut this page, you may order on a separate sheet of paper. Please mention MOTHER when you do.

Presenting Our Environmental Hall of Fame inductee for 1983:

RICHARD ST. BARBE BAKER



In the past two issues of this magazine, we introduced the first 13 members of our Environmental Hall of Fame . . . one for each year of MOTHER's existence. They were (in case you missed them) John James Audubon . . . Henry David Thoreau . . . John Muir . . . Theodore Roosevelt . . . Rachel Carson . . . David Ross Brower . . . Jerome Irving Rodale . . . Aldo Leopold . . . Jacques-Yves Cousteau . . . Barbara Ward . . . Sir Albert Howard . . . René Jules Dubos . . . and Anwar Fazal.

Now, at last, we have the privilege of introducing our first annual *selection, the inductee for 1983: Richard St. Barbe Baker.*

Living from 1889 to 1982, Richard St. Barbe Baker was a professional forester, author, lecturer, and conservationist. The man truly dedicated his life to planting trees: He saw more than 26 trillion *of them seeded! This and other aspects of his work took him across the world. St. Barbe spent years working in Africa and New Zealand . . . initiated the "Save the Redwoods" campaign in California . . . directed the Sahara Reclamation Program . . . founded the World Forestry Charter Gatherings and the Men of the Trees society . . . and organized forestry summer schools at many universities.*

In his writings, St. Barbe shares with us an intellectual philosophy and a deep spiritual vision. His books include I Planted Trees, Green Glory, Africa Drums, Famous Trees, Trees, Book of the Seasons, Among the Trees, Dance of the Trees, The Redwoods, Sahara Challenge, Land of Tanē, *and* Sahara Conquest. *The following short excerpts—reprinted with permission of the Lorian Association—are from St. Barbe's autobiography,* My Life, My Trees, *which was published in 1970.*

I learned early to regard the forest as a society of living things, the greatest of which is the tree. Its value depends upon its permanence, its capacity to renew itself, to store water, its many biological functions including that of providing Nature's most valuable ground cover, and building up to a great height stores of one of the most adaptable of raw materials: wood.

We stand in awe and wonder at the beauty of a single tree. Tall and graceful it stands, yet robust and sinewy with spreading arms decked with foliage that changes through the seasons, hour by hour, moment by moment as shadows pass or sunshine dapples the leaves. How much more deeply are we moved as we begin to appreciate the combined operations of the assembly of trees we call a forest.

As long as a soil is covered with forest, its humus is maintained. The basic forest problem lies in its composition and regeneration. In the forest the processes of decay and growth always balance one another. The vegetable wastes together with the by-products of the animal population form a mixture on the forest floor. As we examine this mixture from time to time we find it remains practically constant in depth, in spite of annual additions from leaf-fall that take place. This mixture is drawn upon at an even rate by earthworms, fungi, and bacteria, and the resulting humus in turn is absorbed by the soil and provides the trees and undergrowth with the food materials they require. Thus the forest manures itself and with the help of the earthworms and other animals distributes this manure through the upper layers of the soil. Everything is done by Nature quietly and efficiently. No artificial fertilizers, no selective weed-killers, no pesticides, and no machinery are needed in the household of the natural forest.

In that vast evergreen forest Nature works in perfect rhythm; roots digging deep or exploring nearer the surface for food and moisture. Imperceptibly Nature builds those mighty pillars with aisles innumerable, arches multiplex, in the cathedral of the forest.

A teeming life goes on in the forest without any of the problems that confront mankind in similar circumstances. There are no dustbins to empty, no water-borne sewage, no town clerks or city councillors or armies of officials, with more and more rates to pay, no ever-growing burden of debt.

The forest solves its own sanitary problems by direct action while man evades them. The forest has been described as the perfect sanitarian, the supreme chemist. In its economy it perfectly combines Capitalism, Communism, and Social Credit and instead of building up a burden of debt it stores up real wealth—the wealth of the woods. As Henry van Dyke so aptly put it:

In the wealth of the woods since the world began
The trees have offered their gifts to man.

* * *

The Ancients believed that the earth was a sentient being and responded to the behavior of man upon it. As we have no scientific proof to the contrary, should we not accept this point of view and behave accordingly?

I look at it like this: If a man loses one-third of his skin he dies; the plastic surgeons say, "He's had it." If a tree loses one-third of its bark it dies. This has been proved scientifically by botanists and dendrologists. Would it not be reasonable to suggest that if the earth loses more than a third of its green mantle and tree cover, it will assuredly die? The water table will sink beyond recall and life will become impossible.

* * *

Under existing systems food looms large and there is a constant threat of famine over wide areas, but if we treat reforestation as seriously as we do national defense, and turn from an animal economy to a sylvan one, we shall be able to look forward confidently to the time when food will worry us as little as the air we breathe. Indeed, when we have every man under his own vine and fig tree in a perfect earth, beautified by complete landscape husbandry, then with St. Francis of Assisi we shall be able to say:

"Praise be, my Lord, for our Sister, Mother Earth, which does sustain and keep us and bringeth forth diverse fruits and flowers of many colors and grass."

EDITOR'S NOTE: My Life, My Trees *is available for $6.95 (include an additional 70¢ for shipping and handling) from the Lorian Association, Dept. TMEN, 568 Grand Canyon Drive, Madison, Wisconsin 53719.*

And don't forget to write us to send in your nominations for next *year's selection!*

We'd like to share with you two (more) economical ways to reduce window heat loss.

THERMAL COVER-UPS:

You may recall that in the last issue of this publication (see "The Homemade Thermal Shade" on page 182 of MOTHER NO. 84) we presented three varieties of fabric thermal shades, all of which rang in at about $10 a window. (In case you missed that heat-saving advisory, we should tell you that the price is *very* modest: Commercial window insulators can cost $90 or more!) Well, in this installment, we're going to present two other methods of insulating your home's portholes that are particularly good for covering *large* expanses of glazing. And in keeping with our previous models, these heat-holding panels can be made for little more than $10 a window.

Our shutters are primarily composed of expanded polystyrene insulation, a foamlike material that comes in 4′ X 8′ sheets and is often used in the building trades. "Beadboard", as it's known, is rigid yet light in weight and easy to work with. It makes a durable, inexpensive, and simple-to-install thermal shutter. Polystyrene is rated at R-4 to R-5 per inch (so in the case of the 1-1/2″-thick pop-in shutters detailed below, the insulative value would be about R-7).

MOM's thermal panels are pretty much of the "generic" variety, but you can fancy up these no-frills shutters with paint, fabric, or wallpaper if you like. The foam panels may be left in the windows to forestall heat loss both day and night . . . or you can remove the cover-ups (which obviously *do* block out light) to let in the sun's rays during the day. If you decide to keep the shutters in the windows for long periods of time, you should check occasionally for mold or mildew caused by condensation of moisture. Wiping off window surfaces with a dry cloth and dabbing diluted chlorine bleach on the sills can help prevent such problems.

COVER-UP NO. 1: THE POP-IN SHUTTER

Our first thermal project this go-around was designed for a 3′ by 7′ expanse of glass that included one 32″ X 36″ unit and two 23″ X 36″ windows. To cloak these panes, we decided to make three *pop-in shutters* . . . beadboard blocks lodged in a wooden frame and wedged in the window. The sills and casings we worked with had adequate depth to accommodate our shades, but you could insert the panels in a window without a casing—such as those found in a mobile home or on a brick or stone-veneered wall—if you mounted an exterior frame around the window first.

For the three window coverings, we purchased five 8′ lengths of 1 X 2 fir (at a total cost of $9.60) and two sheets of 3/4″ polystyrene at $8.29 per sheet. Thus, the cost of the basic materials came to $8.73 per window . . . and there was enough lumber and beadboard left over to cover at least one more window. We also used four 2-1/2″ inside corner braces ($1.79 per package of four) and one tube of Quick Bond Panel and Foam Adhesive ($1.39) to complete each window. (Of course, you can use a different kind of glue than the one we chose. If you do, be sure to spot-test it first on some polystyrene to make certain it doesn't damage the beadboard.) That brought the total cost for each of the three thermal shutters to $11.91.

It took us a little less than two hours to put together our first insulative panel, but —with some experience—you could easily shave time off that figure.

MAKING A SANDWICH

To make a pop-in shutter, measure the window you want to cover. Originally, we intended to treat our entire expanse of one large picture windowpane and two double-hung units with *one* shutter . . . but we discarded this idea because of the unwieldiness and weight of a thermal covering that large. The smaller panels we settled for produced one unexpected bonus: They can be put in place without disturbing the existing draperies.

If your own windows stand perfectly true and square, sizing the frames will be a breeze. Otherwise, to custom-fit the framing strips, first measure the opening from side to side and cut two wood pieces to fit, using either a handsaw or a circular saw. Then stack these two members on top of each other on the windowsill, and measure the interior vertical gap to size the remaining two framing strips. You can recheck the fit after you've cut the wood by wedging the members in on top of the stacked pieces and adjusting as necessary. If there are differences in those measurements, mark the strips "top", "bottom", and "side".

After that's done, take the strips to a level workspace such as a bench or a concrete floor to lay out and assemble the frame. We used 1-1/4″ 3d finishing nails to secure our strips, then reinforced each right angle with an inset corner brace. (Hint: It's easier to insert the screws in the corner braces if you first rub a little soap on them.)

Next, take the finished frames and recheck their fit in the window, using a wood file to smooth off any still-tight places. After setting a frame on the polystyrene, scribe the inner dimensions of the wood onto the beadboard with a marking pen. Cut out the foam block with a long-bladed utility knife. Then flip the frame over, draw another rectangle on a second section of foam, and cut it out. Mark the position of the two foam blocks for future reference ("top", "bottom", "facing into the frame", and so forth).

If you used corner braces, you'll need to bevel the inside corners of the polystyrene pieces a bit so that the blocks will fit snug against the braces. Once you're satisfied with how the beadboards fit, take them out and apply the adhesive in a swirl pattern to the interior surfaces of the foam sections . . . *and* run several additional beads of the adhesive along the inside of the frame. Then press the two pieces of foam gently to spread the glue around.

Now, pull the polystyrene sections apart, add glue to any dry spots (your glue may need to "cure" a bit before final sealing), and place them in the frame. To form a tight seal, run some last beads of adhesive around the edges of the frame where they're butted by the polystyrene. You can then lay the assembly flat on a floor or workbench and weight it with a moderately heavy object until the panel is dry.

Our pop-ins fit snug enough to stay in our windows without any additional fastening. However, if your thermal shutters are a tad loose, it might be a good idea to fasten hardware-store turn buttons in several spots around the edge of the window frame to hold in the polystyrene panes.

We finished the insulative shutters with a coat of leftover latex paint (don't use an *oil-based* one, since it might harm the foam). You can put several posters on yours . . . for a kind of "gallery" effect, or, if you're willing to invest a few more dollars, you can decorate the polystyrene with a cloth covering or glue some wallpaper over it. And, of course, the inserts may be left unadorned, particularly if you'll be covering them with curtains.

COVER-UP NO. 2: BEADBOARD PANELS

Probably the biggest "energy thief" in American homes and apartments is the sliding glass door. Happily, though, its correction is one of the simplest and least expensive home fix-its you can perform to save a few bucks on your heating bill.

All you'll need is a piece of 3/4″ X 4′ X 8′ beadboard for each glass door panel you plan to protect . . . 36 six-inch-long magnetic strips (these can be salvaged from the self-sealing gaskets in junked refrigerators) . . . and a tube of 3M Super Weatherstrip Adhesive (Part No. 08001), which can be purchased at a hardware or auto parts store. Again, spot-check to make sure the adhesive won't melt your foam before making widespread use of the product.

To make your panel, simply measure the height and width of each glass door frame—right to the outer edges—and cut the insulation boards to these dimensions. Cover not just the glass itself but as much of its aluminum casing as possible, since the metal transfers heat to the outdoors, too. Even if you own a *wood-cased* door, it's a good idea to cover the frame. The air space thus formed between the pane and the beadboard adds to the cover's insulative effect.

Once the panel is trimmed to size (you *did* make snug cutouts for handles, latches, or anything else that would prevent the sheet from fitting flush against the frame, right?), go on to glue half (18) of your salvaged magnetic strips to the *door's* framework . . . placing six at either side of each large glass

STAFF PHOTOS

PART II

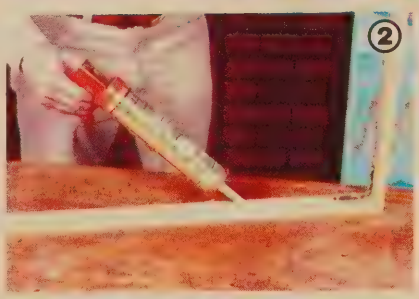
pane, plus three at the top and three at the bottom.

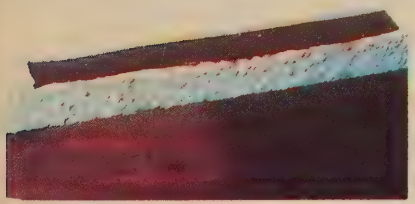
Next, take a soft-lead pencil and coat the face of each strip with graphite, then position the polystyrene sheet in place over the frame so that the board picks up the pencil marks at each magnet's location.

Now, using a single-edged razor or a small utility knife, cut a channel at each smudge spot and cement the remaining 18 magnetic strips so that they'll serve as mates to those on the door. Remember that, in order to make the panel fit flush against the frame, each pocket must be *twice* as deep as the thickness of one strip.

Your heat-stopping device is now ready to install. As with the pop-in models, you can jazz up these $10 wonders with decorative fabric, wallpaper, or a latex-based paint.

Whatever route you choose to limit the heat loss from your home's glazing, remember to store the polystyrene panels carefully during *warmer* weather. Don't expose the cover-ups to dampness, and set them away from high temperatures to prevent them from becoming warped. Then they'll be as good as new next year, when it's time again for those annual chores of getting in the wood, raking up the leaves . . . and putting in the thermal shades!





COVER-UP NO. 1, THE POP-IN SHUTTER: [1] After assembling a wooden frame to fit your window, lay it on a sheet of insulation so you can mark and cut out the beadboard. Do this again with another piece of insulation so that the shutter will be two layers thick. [2] Once you've thoroughly glued the two sections of beadboard together, run some additional adhesive along the inside of the frame. [3] A completed, airtight corner. [4] The final product is easy to install . . . attractive . . . and very inexpensive! COVER-UP NO. 2, A BEADBOARD PANEL: [5] This large, unframed heat holder is held in place by salvaged magnetic strips that have been glued into channels along the insulation. [6] A completed panel will help keep Old Man Winter from knocking on your glass doors!

"No need to knead, or fold your dough
If you'd be roundly fed.
For yeast is least,
And taste's increased
With a loaf of Whoopie bread"
Down on the Farm
by L. Bruce Holman © 1983
"The Upper Crust"
WHOOPIE
HEY, MAMA, MR. KISSOFF GOT IN... WE SHOULD FIX THE SCREEN DOOR!
HELLO, MORT... SORRY YOU'VE GOT TO LEAVE SO SOON!
BUT OUR CAT HAS AN ALLERGY TO YOU.
SPEAK NOT THUS, FRIENDS! MY COMPANY, PAN-DEMISE, INC., HAS TIDINGS OF GREAT JOY!
HAVING MET A BIT OF CONSUMER RESISTANCE TO OUR SCHEME TO MARKET TOXIC WASTES AS A WEED-CONTROL PRODUCT...
...WE'VE DECIDED TO COUNTER WITH A LINE OF BAKERY GOODS!
...SUCH AS OUR NEW WHOOPIE BREAD! "Just like Grandma would have made if she'd owned a factory."
AS A MATTER OF FACT, WE JUST HAPPEN TO BE MAKING BREAD TODAY.
EE-YUCK... WHAT'S THAT WEIRD SMELL?
THAT'S YEAST WORKING! BREAD DOUGH IS ALIVE!
ALIVE! YOU EAT SOMETHING ALIVE?
MR. KISSOFF LIKES TO EAT DEAD THINGS?
NOW THERE'S A GOOD IDEA! STRANGLE IT TO DEATH BEFORE IT GETS US ALL!
NO, I'M KNEADING IT. THEN WE'LL PUT IT IN PANS TO RISE.
YOUR BREAD IS CREEPY! MY WHOOPIE BREAD DOESN'T MOVE... IT JUST LIES THERE AND SUBMITS!
WHAT INGREDIENTS ARE USED IN YOUR WHOOPIE BREAD?
JUST LIKE THE LABEL SAYS, WE USE ONLY THE FINEST NATURAL INGREDIENTS: "...Enriched, bleached white flour...."
"ENRICHED" MEANS THAT ALL THE GOOD STUFF HAS BEEN TAKEN OUT AND ONLY PART OF IT IS PUT BACK IN!
"...and very many exotic-sounding chemicals added to retain freshness, add color, texture and flavor!"
CHEMICALS WHICH MAY OR MAY NOT BE CARCINOGENIC... IF YOU CAN'T PRONOUNCE THE INGREDIENT, DON'T EAT IT!
OUR FIRST BATCH IS OUT OF THE OVEN... CARE TO TRY SOME WITH HOMEMADE BUTTER?
AND BEE-MADE HONEY?
NO! GOT TO BE ON MY WAY! CORPORATE LOYALTY CALLS!
(EGADS, THAT SMELLS GOOD!!)

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NOTE: If you prefer not to cut this page, you may order on a separate sheet of paper.

Recent tests show that you can raise healthy plants without bright sunlight, using . . .

PHOTOVOLTAIC ROOT STIMULATION

STAFF PHOTO

TJ Byers

Everybody knows that there's nothing better than sunlight for promoting plant growth. Or is there? Well, there may not be anything that can actually *replace* ol' Sol . . . but could there be a better way to *use* sunlight to help plants grow?

If recent scientific studies on the electrical stimulation of roots bear out in the real world, the answer is . . . *yes*! These controlled laboratory experiments have produced heartier plants and bigger harvests. Sound exciting? Then let's dig into the details of this potential breakthrough.

PLANT GROWTH

Before a leaf can turn the sunbeams it absorbs into food (a process known as *photosynthesis*), it must have a source of raw materials. Nutrients are absorbed from the soil by the plant through a vast network of roots . . . intricate structures that contribute as much to a plant's growth as does sunlight.

As a matter of fact, an average plant's root system is fully as large as the structure it supports. Few people are aware that a healthy four-inch-tall plant can be expected to have roots that extend at least four inches below the ground. Of course, this isn't true of *all* plants, but it's the norm for most productive crops.

Now since the top half of a plant is dependent on the bottom half, it seems logical that stimulating the growth of the roots might lead to a proportional increase in the size of the greenery above. As you'll see, this appears to be the case. Through a process that isn't yet thoroughly understood, mild electrical stimulation of a plant's roots can indeed promote the growth of the entire organism.

One theory for the phenomenon holds that the electrical stimulation actually supplements the energy received from the sun. But whatever the reason may be, documented studies show that plants that receive electrical root stimulation often grow faster and are heartier than those raised without the treatment.

PV AND PHOTOSYNTHESIS

Naturally, electrical root stimulation requires a source of power. And what better source of free electricity could you ask for than a photovoltaic solar cell?

As in the photosynthetic process, a solar cell absorbs a photon of light and converts it into energy . . . electrical, in this case. Unlike photosynthesis, though, a solar cell does a much more efficient job of converting light into energy. A typical PV cell, such as the kind you can find in a Radio Shack store, converts at least 10% of the light it receives into electricity. Photosynthesis, on the other hand, is hard pressed to turn 0.1% of the available light into energy.

ACTUAL RESULTS

Experiments done at the University of Maryland show that if the output of just one solar cell is fed to a plant's roots, a sizable increase in growth can be expected. In one test comparing growth in salvia plants, the experimenters began with 26 samples and subjected 14 of them to electrical stimulation from a PV cell. The other 12 served as a *control* (or baseline) and were cared for in the same way the stimulated plants were.

At the end of four weeks, the experimental group averaged 10-1/2 inches in height, while the control group averaged only 5-1/2 inches . . . demonstrating that stimulated plants grew almost twice as rapidly as "normal" ones!

Other tests have shown that through photovoltaic treatment a plant can be pushed to an early bloom. One course of investigation even subjected sickly greenery to root stimulation. The result of such solar "shock therapy" was a marked improvement in the condition of the specimens!

TRY IT OUT

If this sounds too good to be true, you don't have to take my word for it. Why not try it yourself? Although I can't guarantee startling results for you—there's just not enough known at this time—I *will* promise that you'll have a good time with your experiment.

First, you'll need to obtain a photovoltaic cell suitable for the test. Although you could assemble your own solar generator from readily available parts, I recommend that you purchase a Sun Stik from Silicon Sensors, Inc., Dept. TMEN, Highway 18 East, Dodgeville, Wisconsin 53533. One Sun Stik costs $7.50 (plus $1.50 shipping and handling), which is about half of what it would cost to make your own. *[EDITOR'S NOTE: Resourceful readers who have access to surplus cells may be able to beat Silicon Sensors' price . . . simply attach electrodes to the two leads on the photovoltaic disk. If you do decide to build your own, make sure that the silicon cell is completely protected from moisture.]*

For the most accurate results, you should begin your experiment with two identical plants. Set them in separate pots, and push the metal rods of the Sun Stik into the soil of one of them. Place the two competitors in an indoor location where they'll receive about the same light, and water and care for them equally. After around 30 days you should notice an amazing difference between them: The solar-powered plant ought to be larger and have more foliage.

THE CATCH

"Ah," you say, "I knew there'd be a catch. It *is* too good to be true." Not exactly, but the catch is that the root stimulator works best on plants that *aren't* exposed to much sunlight. Those studies I mentioned before showed that foliage exposed to bright sunlight receives little or no benefit from root stimulation.

Why? Probably because photosynthesis can supply enough energy in bright sunlight to serve all the plant's needs. Photovoltaics only offer a significant boost when *other* sources of light are reduced or unavailable. In other words, it probably wouldn't do much good to pepper your cornfield with Sun Stiks.

But remember that a solar cell does a more efficient job of converting sunlight into energy than does photosynthesis. PV, then, can generate usable amounts of electricity under lighting conditions that would be useless to the leaves of a plant (this includes fluorescent and tungsten lamps used for everyday indoor illumination). So imagine what a solar root stimulator might do for that fern hanging in the den!

PRACTICAL USES

Besides perking up light-starved houseplants, what practical applications might a PV root stimulator have? Well, for one, tests have shown that *seeds* placed within an electric field sprout more quickly and are more prolific. So if you used a solar disk on your starts, instead of having—say—only 50% of your seeds germinate, you could expect a success rate of 75% or better.

Second, root stimulation works particularly well on *seedlings*, so a solar cell could be able to help you germinate and raise your starts indoors before the spring thaw comes. When it finally warms up enough to put your young plants out, you'll have a good jump on a healthy garden, one that has hearty, substantial stock rather than fragile, underdeveloped seedlings.

More research needs to be done on this exciting new process. But if you want to do a bit of investigating yourself, the investment is small and the work's relaxing. Who knows, with a little imagination and honest effort, you just might come up with *the* application this technology is waiting for!

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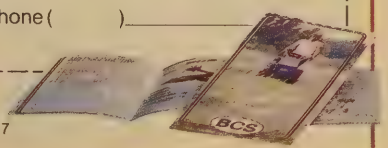

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STAFF PHOTOS

[1] A potpourri of dowsing tools (clockwise, beginning with the lower left-hand corner): L-rods with handles . . . a Y-rod . . . a pendulum . . . a bobber . . . and plain L-rods. [2] The ASD headquarters in Danville, Vermont. [3] A common sight during the week-long dowsing workshop: An experienced water diviner (foreground) shows students how to use Y-rods. [4] Novices practice with L-rods. [5] The author (finally) finds water!

DOWSING: FACT OR FANCY?

Last fall, carrying a sparsely packed knapsack and all manner of misconceptions about dowsing, MOTHER's staffer Fran Adams trekked off to the lovely Green Mountains of upstate Vermont to visit the Dowsing Center of America in order to seek out the truth behind the legendary forked willow branch. She made two startling discoveries: [1] that modern-day dowsers think there's a whole *lot more to their art than just snooping out water, and [2] that—son of a gun!—as far as she could tell, it really and truly . . . well, read Fran's report to see for yourself what happened.*

In mid-September, equipped with what I considered to be enough skepticism to ward off any potentially mind-boggling phenomena, I headed off to Danville, Vermont to attend the 23rd Annual Convention and the school of The American Society of Dowsers, Inc. Since I'd read in the brochure that the implausible-sounding theme for this year's week-long event was "Dowsing: Steps to Higher Consciousness", I figured I was in for little more than a few pleasant days of enjoying the fall colors and watching a bunch of spacey old codgers in overalls wander about in search of the Zen of water.

This mind-set (or more accurately, *ignorance*) left me totally unprepared for what I actually observed and absorbed during my brief but intensely thought-provoking sojourn in New England. For, as it turned out, I soon found myself far too busy trying to learn how to dowse (and then attempting to figure out what the heck it was that I'd just learned how to do) even to remember to enjoy the autumn landscape . . . until I was flying over it on my way home.

Now I realize that this may sound a bit confusing and—let's face it—*hokey* to you unless, of course, you're already a dowser. I mean, first I claim that I'm an avowed skeptic, and then I claim that I learned to dowse? What's going on here . . . where did all that good, honest disbelief go? Well, the only thing I can tell you is that—when I found myself in the company of some of this country's (and Canada's) finest and most respected practitioners of the art—my reservations, like the fall flora, just didn't seem as important as what these folks had to teach me.

SO MUCH FOR STEREOTYPES!

The first thing I learned was that dowsers aren't the aloof, overall-clad social drop-outs I'd imagined them to be. (In fact, the only overalls I saw all week were the ones I'd brought with me, thinking they'd help me blend in!) Rather, most of the folks I saw and spoke with were extremely friendly and down-to-earth. Maybe there *used* to be a stereotypical water diviner, but today's dowsers come from all walks of life (they range from professionals to homesteaders), and most of them are well educated. At the convention I met a nurse from New York City . . . a businessman from Atlanta . . . an airline pilot (with his wife and two sons) from Montpelier, Vermont . . . a therapist from Danville . . . a young film-maker from Boston . . . a carpenter/farmer from upstate New York . . . and a handful of students (on ASD scholarships) from Washington, D.C. The only thing they all had in common was dowsing.

If I had to characterize them as a group, I'd say that dowsers are a warm, generous, concerned "family" of people who trust wholeheartedly in their divining abilities and who are always ready to use their special talents to help someone else out. Moreover, ASD folk adhere to a strict code of ethics, believing that their activities should be used only to serve—as they say—"the good of the higher self". In other words, whether searching for water, oil, minerals, health, earth energies, or whatever, a dowser should never give in to greed or seek anything that he or she has no business exploring.

Indeed, most of them take very little payment for their services . . . and what money they *do* take, many donate to good causes. An example of a contemporary water diviner is Paul Sevigny, a practicing judge in Danville and the current president of ASD, who has located water for more than 650 wells with his dowsing skill. All the money he made from that work has gone to local charities.

Water's hardly the *only* thing that modern dowsers are after. For instance, some of the other speakers (besides Paul) at the convention were Bob Brewer, a Canadian who not only helps people find water, but also claims a special prowess for dowsing racehorses' legs to detect injuries before the animals are sold off the track . . . Dave Bagley, a researcher in parapsychology at the University of Oklahoma, who's been divining for oil for the past 12 years and has more than 450 successful wells to his credit . . . and Danville resident and the ASD school's cochairman Ed Jastram, a retired Texas Instruments engineer and a current pioneer in the realm of *health* dowsing, using the pendulum.

School cochairman Sig Lonegren, who has an M.A. in "Sacred Space" from Goddard College and is a researcher in the British Isles, uses *his* talent to explore the mysteries of the earth's energies beneath ancient ruins and holy places. There was also a mime artist

from New York City (a former student of Marcel Marceau), who travels all over Scandinavia with his performing dog Rufus, incorporating dowsing thought-forms in his act. (I'm not going to tell you what he did: You'd have to see it to believe it . . . and even then you might not be able to!) The list of dowsers-extraordinary—and ordinary—went on and on. By the end of the week, well over 500 diviners had descended upon the tiny town of Danville.

Although I soon came to the conclusion that most dowsers are quite normal and/or fascinating folk—and that some of them must be very good at what they do—I was still stuck wondering what the heck it *is* that they do. Fortunately, the two-day training school that preceded the actual convention was designed to answer this and the other questions I had up my sleeve. How? By offering basic instruction on how to perform the oldest form of dowsing known to man, water divining . . . for the ASD theory is that only through the *doing* can a novice truly understand the art.

"ANYONE CAN WHISTLE . . ."

During the lectures and fieldwork of the intensive school program, I heard repeatedly that, with practice, patience, concentration, and—above all—confidence, *anyone* could learn to dowse. ("Even me?" I wondered.) I was also told that every diviner should be adept at using the basic tools: [1] the Y-rod, fashioned in the form of the "classic" forked branch, [2] L-rods, two right-angled metal rods, [3] the pendulum, a weight hung like a plumb from the end of a string or a chain, and [4] the bobber, a long, flexible shaft that's weighted at one end with a coil. These tools didn't have to be elaborate: A number of students made their own, using wire coat hangers as L-rods, a nail or a pendant on a string as a pendulum, or a radio antenna as a bobber. (I bought my tools from ASD.)

According to most of the teachers at the school, it's a good idea to begin by learning the simplest form of dowsing, water divining, using *all* the tools. Then later—when you've got the basic technique down—you can go on to other areas of divining (oil, plants, health, earth energies, and so on) and discover where your interests and natural skills lie, as well as which tools work best for you.

WHERE'S THAT PROOF?

Still, during all the discussion of Y-rods and water veins and which methods work best when, I never heard a really clear, sensible, *scientific* explanation of what dowsing is or why it works. And to tell the truth, the more I saw people pick up rods and immediately start operating with them, the more I felt as if I were the only one who seemed to need such definitions.

Gradually, it dawned on me that the reason I never got a practical rationale of dowsing was that there *isn't* any. According to the ASD, the only way to understand dowsing is to experience it . . . and to do that, you simply have to take it on faith that the skill arises from using one's *subconscious* (or, as the dowsers call it, the Universal Mind) to discover something that the *conscious* mind can't comprehend. This theory holds that the tools used are merely a tangible, visible means by which to communicate with the subconscious. Experiments run on dowsers in the hope of coming up with a more down-to-earth analysis of the process haven't been able to pin it down yet. *[EDITOR'S NOTE: For further reading on this and other dowsing-related topics, take a look at* The Divining Hand *by Christopher Byrd. This fascinating book depicts the past, present, and apparent future of the art, and can be purchased for $13.50 plus $2.70 for shipping and handling from The American Society of Dowsers, Inc., Dept. TMEN, Danville, Vermont 05828-0024.]* Needless to say, without a satisfactory definition or proof of what dowsing is or isn't—other than what I heard and *thought* I saw—I either had to remain a doubter or give the practice a good, honest hands-on try. I chose the latter.

My first efforts were pretty self-conscious and uneventful. No matter how hard I tried, I couldn't get the reaction I was supposed to from my ornery Y-rod! I had better luck with the L-rods. Besides being more comfortable in my hands, they had an intriguing feeling of weightlessness. Actually, they seemed to wiggle around of their own accord. So I mustered up all the "I believe in fairies" enthusiasm I had, and made up my mind to win over these flighty tools.

The instructor said to settle the rods down and get them into the *ready* (or *search*) position . . . which in L-rods means facing front and parallel to the ground. I silently told my tools to behave and straighten up, but they didn't listen and continued to let themselves be pulled this way and that . . . by gravity or whatever. I became more emphatic, and spoke out loud to them. This time they listened. Gradually they slowed down, pointed dead ahead, and were still. For a minute I was afraid to breathe, lest I disturb them and set them off again . . . and also because I had *no* idea how I'd gotten them quiet in the first place. To my knowledge, I hadn't moved a muscle to control them. Really!

With sprouting confidence, I took a deep breath and asked my L-rods to move into the open, uncrossed (or *yes*) position. They did so without the slightest hesitation. Then I commanded them to cross in front of me to indicate *no*, which they also did promptly. Figuring I was on a roll, I decided to use my new "friends" to try dowsing for one of the water veins that were marked on the Danville green with pieces of pink string. So I got the rods back into the search position, and—closing my eyes and concentrating very hard—I asked them to point in the direction of the nearest vein. When I opened my eyes, both L-rods were aimed directly toward the telltale pink cord closest to me!

Next, trying hard to keep my attention on the tips of the rods (and *not* on the string!), I walked slowly in the direction they'd told me to go, asking them to signal *yes* when I hit water. The first time I crossed the string, nothing happened. I retraced my steps and went back over . . . still nothing.

My enthusiasm was dwindling rapidly, and my doubts were coming back to the fore, when my instructor (a kindly middle-aged woman with a soft but stern voice) called out, "Don't give up! Stop and relax for a minute. Then try again, *very slowly*." She came over, put her hand on my shoulder, and gently advised me to concentrate on what I was looking for . . . but not to force a reaction.

The next time I reached the string, my rods flew wide open.

"Try again!" she exclaimed. "And this time, don't look down. Look up, and think only of *water*."

I did as I was told . . . and when I felt the rods open up again, I looked down. Once more, there beneath my feet was the lovely pink string! I repeated the exercise several times and I continued to get the same reaction from my instruments. I was so astounded that I probably would have kept at it all day, except that—as my stomach kept pointing out—the lunch hour was past and I was starving.

Now maybe all that I experienced was the result of autosuggestion . . . who's to say? And who knows (but the dowsers who laid them out) whether or not there was water under the pink strings? Nevertheless, whether

(continued on next page)

THE AMERICAN SOCIETY OF DOWSING, INC.

ASD is a nonprofit "educational and scientific" organization that was formed by 11 professionals and businessmen who met yearly at Danville's fall foliage festival to discuss their avocation of dowsing. Feeling a need for an official national society devoted to the field, they spelled out the following objectives in a charter that is still adhered to today:

[1] To give dowsing a stature of dignity and authority.

[2] To win for dowsing respect and recognition for its great worth.

[3] To help members with their dowsing problems.

[4] To give assistance, guidance, and encouragement to beginners.

[5] To disseminate knowledge and information about dowsing to as large a group as possible.

ASD later added a sixth goal: To research dowsing and coordinate research by others.

ASD yearly membership dues are $15 for individuals, $20 for families, and $7.50 for juniors. Members receive the quarterly The American Dowser, *as well as discounts on school and convention fees. (All dues, contributions, gifts, and bequests to ASD are tax-deductible.)*

For further information on any aspect of dowsing, write to ASD at the address listed in the editor's note in the article. The friendly people there will be happy to send you free brochures explaining what dowsing is and what their organization is all about. They also have full supply lists of excellent publications and dowsing equipment, and—should you need the services of a dowser or want more personal contact with practitioners of the art—ASD can help you.

So if you're interested in attending next year's convention, becoming a member of ASD, or just learning more about divining, drop these folks a line. Please remember, though, that—as always—MOTHER asks that you send along a dollar or two with any requests, in order to help the organization defray costs.

(continued from preceding page)
I programmed or *dowsed* my responses, I know that my first brief success with L-rods was enough to pique my curiosity about this new "sport" . . . not only because I might really find water with it, but because it was a lot of *fun*!

LEVELS OF PROFICIENCY

Many diviners believe that there are seven different degrees of competency in their art, as first defined by the world-renowned dowser and past president of ASD Terry Ross. He listed the following levels of dowsing:

[1] *On site:* tromping around a field, tool in hand, looking for water.

[2] *Edge of the field:* standing at the border of a site and "asking" where to go before actively stalking water.

[3] *Over the horizon:* map dowsing or any other form of divining that's done away from the actual locale or person being investigated.

[4] *Deviceless:* divining without tools.

[5] *Affecting a change through dowsing:* as an example, in health dowsing, stopping an illness.

[6] *Causing something new to happen:* for instance, not only stopping an illness but promoting healing.

[7] *"Thy will be done":* achieving a oneness with God.

Of course, few people claim to have reached the seventh state, and most practitioners would be happy to get to the fourth level, but these definitions provide a dowser with goals to strive for. According to Dave Bagley, who's a knowledgeable geologist as well as a successful oil diviner, attaining each of these steps requires hard (and at times very frustrating) work . . . but with each new level comes fresh insight and renewed growth that will bring a dowser closer to a deeper, more spiritual awareness of the universe.

Dave also said, "Dowsing is a *science*, and its accuracy can be tested over and over again, once you know the formulas. But one reason the practice has been so misunderstood and scoffed at in the scientific world is that heretofore scientists have refused to believe in anything beyond the physical . . . and dowsing is predominantly mental." He went ón to say that there's hope for scientific recognition of dowsing, however, since some physicists now claim that the next quantum leap in science will be in the direction of the nonmaterial realm.

STEPPING UP

Intrigued by what Mr. Bagley had to say and inspired by my tiny triumph with the L-rods on the Danville green, I decided to experiment with some Level 3 ("over the horizon") dowsing in my hotel room one night. Taking out my pendulum, I asked it whether or not a high school soccer team (coached by a friend of mine) had won its game that afternoon. The pendulum swung in a counterclockwise circle, which—for me—was supposed to indicate *no*. Then I asked it by how many points they'd lost, beginning with one and counting upward. When I got to five and the pendulum still said no, I quit. *Surely* those poor kids couldn't have lost by five whole goals.

Two days later, when my friend met me at the airport, I asked him what the score of the game had been. "We lost, eight to nothing," he groaned. Eight to nothing! Why, those kids hadn't lost by five whole goals . . . they'd lost by *eight* of them!

Musing about it now, I realize that I'll never know what would have happened if I'd trusted my dowsing and kept the pendulum going up to eight . . . but it sure is fun to consider the outcome if I had!

SO WHAT DOES ALL THIS MEAN?

All in all, I experienced and heard some pretty heady stuff in Danville. And my trip to the dowsers' school and convention opened up my mind to possibilities for personal growth that I might not have considered before. Most important, I've come to realize that, although certain phenomena simply don't lend themselves to clear, scientific definitions (as yet), they're no less valuable or useful for the good of humanity and the earth we live on.

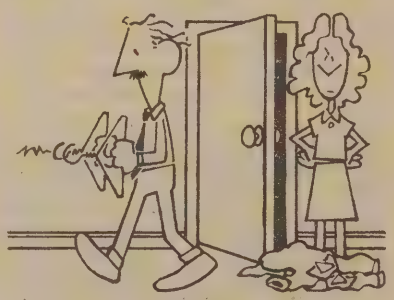
A brief postscript will perhaps sum up my feelings: Right after I returned from Vermont, my local newspaper printed an article about an 80-year-old dowser named Don Witherspoon, who'd found water for the Gates Rubber Company in Colorado . . . after a driller with $350,000 worth of equipment had come up dry. According to the AP release, Witherspoon (using only a forked branch as *his* equipment) located two wells that are currently yielding a total of 70 gallons per minute! When asked how he did it, the dowser said, "I reckon it's a gift. I don't try to explain it no more. All I know is, it works." And, as far as I'm concerned, that's a fact!

STRING-DOWSING WITH COAT HANGERS

This easy practice exercise will give you a simple way to work on your dowsing skills and to check your responses as you go along. Find two ordinary all-wire coat hangers (they work just like L-rods) and a long piece of thread. Then clear a space in your living room and lay the thread in a line down its center. Now, stand at one end of the open area with your tools in the ready (or search) position, lightly grasping the back of each and pointing its hook straight ahead. Hold your instruments slightly above waist level, a little less than body width apart (so you can keep an eye on both hooks at once). Be sure they feel balanced in your hands—perhaps letting them point down slightly—so that they don't get pulled around by gravity.

The object of this exercise is to find the string . . . through dowsing. *Of course, you already know where it is: It's right where you put it, in the middle of the floor! So the trick is to turn off your conscious mind and to wake up your intuitive, subconscious one.*

One method of doing this is to blank everything out of your consciousness except the thing you're looking for: the thread. Either concentrate on a mental image of it or say the word thread *over and over. Or, like some dowsers, you may want to tell your instruments what it is they're searching for, and then erase any thoughts whatsoever from your head. Choose whichever technique works*



best for you, but don't let any distractions creep into your mind.

Now, beginning at one end of the room, slowly make your way across the open space. If you have a strong gift for dowsing, the hangers will swing wide open (or close inward) the first time you reach the thread. However, if you're like most of us, you'll probably make it all the way to the string and across the whole room with your rods still in the search position.

What went wrong? Well, maybe you were too tense: Relaxation *is the key to accurate dowsing. Or perhaps you lost your adventuresome spirit and let a thought like "This is silly" pop into your head. Remember that* confidence *is another must for a dowser.*

However, like most novices, you probably just weren't concentrating hard enough. So turn around, retrace your steps, and try again . . . this time with single-mindedness. Don't let your mind drift to other matters (such as the delicious scent of gingerbread baking in the kitchen), no matter how tempting.

Should your hangers remain motionless on your second try, don't get discouraged. Sometimes it takes a while to wake up your subconscious and get that old dowsing instinct into gear. Be patient with yourself, and take your time. If, after several attempts, your rods still refuse to budge—and you start getting irritated, hungry, or whatever—put them down for a bit. Try again later, when you feel more relaxed, but don't give up completely. Hang in there . . . you'll get it! And when you do, you just might discover that you're hooked on dowsing!

EDITOR'S NOTE: If the preceding exercise *does* get you hooked, and you'd like to find out more about this exciting newfound skill, why not contact an experienced local dowser and ask him or her to take you out on a trial run? (If you don't already know of such a person, write to ASD, asking to be put in contact with the nearest chapter.) A good dowser can probably show you more in half an hour than you'll ever learn from reading *any* magazine article!

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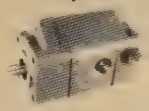

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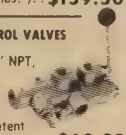

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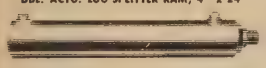

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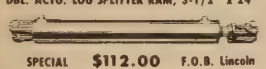

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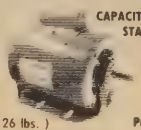

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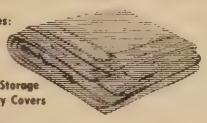

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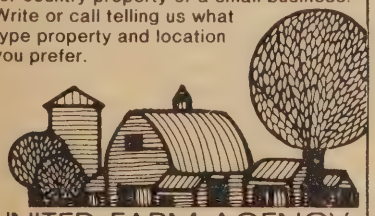

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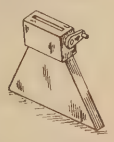

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A WOODSTOVE WATER-HEATING ATTACHMENT

One of the advantages of heating with wood is the variety of needs that just one stove can meet. Besides keeping us warm, a woodburner can cook dinner, dry clothes, and toast chilly toes. But wouldn't it be just dandy if that black box would draw a nice hot bath, too?

Actually, heating domestic water with a woodstove is nothing new . . . many cookstoves had water-tank attachments more than a century ago. The advent of the "airtight" woodburner and pressurized water systems *has* left most of those old batch-heating techniques by the wayside, though, and new methods based on closed circulaton have been developed.

YOU CAN HAVE YOUR HOT WATER . . .

The majority of the modern woodstove water-warming attachments employ heat exchangers that are fitted *inside* the firebox or the chimney of the appliance. The best commercial examples of this approach work very well indeed. If the stove is run most of the day, they can supply a whole family's hot water. For safety's sake, however, these devices are usually made from stainless steel (an expensive commodity) and must be pressure-tested to insure that they are able to withstand the very high temperatures they may encounter inside the heating system. As a consequence, quality internal heat exchangers carry pretty hefty price tags. *Homemade* internal devices, on the other hand, have developed a nasty reputation for scalding steam explosions.

. . . AND (ALAS!) YOUR CREOSOTE, TOO

Furthermore, extracting heat from either the firebox or the chimney of a woodstove can have unfortunate side effects: Pulling Btu directly from the fire (with a firebox exchanger) can reduce combustion efficiency . . . and if the products of incomplete combustion are cooled below the temperature at which they condense (by either a firebox *or* a chimney heat exchanger), heavy creosote accumulation may occur. There is doubtless no need to mention that the combination of a chimney fire and an internal, water-filled heat exchanger can spell disaster.

SAFE AND SANE

Recognizing the fact that there is no uncompensated noon repast, we adopted a conservative approach to designing our own water-heating attachment for a woodstove. Rather than chance placing an exchanger inside the heater or stack, we attached one to the *outside* of the firebox. By taking this tack, we avoided making any major modifications to the heater, which maintains Underwriters' Laboratory certification. What's more, a couple of safety criteria that we've already mentioned are met: The temperatures encountered outside the heater's skin won't *boil* water (as long as that liquid's kept circulating), and the heat used to warm the water is that which would have been radiated by the heater anyway, so no *extra* heat is being removed from the firebox.

Our water-heating attachment consists simply of about 50 feet of 1/4" copper tubing coiled into a plaster of paris–filled panel. The gypsum-based material helps distribute heat evenly to the coils and allows the exchanger to be in direct contact with the stove body without chancing overheating. (We'd like to thank Ed Walkinstik for this suggestion.) The assembly bolts to the side of the heater and is plumbed into a salvaged 42-gallon water heater (we used one with a burned-out element but a sound tank) in much the same fashion as would be a solar preheater.

A 10-gallon-per-minute pump installed on the heater's drain circulates water through the coil and back to a "T" just below the pressure-relief valve at the tank's top (the valve was retained as a safety precaution). Cold water enters the vessel through the normal inlet, and the wood-warmed water moves on to a conventional electric heater through the standard hot outlet. All of the lines are well insulated with 1"-thick high-density foam.

Of course, if the water were circulated constantly, heat could be *lost* to the stove when no fire was burning. To prevent this from happening, researcher Dennis Burkholder made an automatic on/off control from a line-voltage air-conditioner thermostat wired into the pump's power supply line. (You could also use a more commonly available combination heating/air-conditioning control, set on the cooling mode.) The thermostat is attached to the wall three feet away from the heater and about a foot above its top. When the air temperature reaches 80°F, the 120-volt control turns the pump on, and water starts warming up. The built-in differential switch shuts the circulator back off again when the temperature drops to 76°F.

CONSTRUCTION TIPS

The components of the heat exchanger system are shown in the accompanying illustration, but of course each installation will require some alteration of the basic dimensions. For example, if your stove is larger than ours, you might be able to enlarge the panel enough to get a full 60-foot coil of the 1/4" soft-copper tubing inside the up-sized exchanger framework. Those of you who have smaller heaters, however, will have to use a smaller amount of the line.

In any event, it's easiest to work with the tubing as it's been coiled for shipping. We just laid the curled line into the frame and gently bent the tubing to fill the rectangular shape. The flexible material can be arced down to about a 1-1/2" radius without kinking, so it's not difficult to force it into any potential "hot spots". We worked from the outer edges inward, wiring the coils to the backing plate as we went. (Without the wire to hold the outer circles of tubing in place, the whole thing wanted to spring out of the frame.)

Once you get the copper tubing evenly distributed inside the frame, stir up a thin batch of plaster of paris and pour the mixture into the frame. Level the surface by running a straightedge across the angle iron, and allow the material to dry for a couple of days. Then the panel can be attached to the side of your stove, and the 1/4" lines can be plumbed to the preheater tank's 1/2" tubes.

SAFETY AND PERFORMANCE

We ran extended tests to determine the most effective configuration for the exchanger *and* to satisfy ourselves that the device would perform safely. For example, to see what would happen if a power failure shut down our pump, we sealed up the tubes exiting the preheater tank and installed a pressure gauge on the relief valve. The highest pressure we were able to develop in the system was 3 PSI . . . and that was after allowing flow to stagnate for eight hours at the *highest possible* burn rate for our Atlanta Stove Works Catalytic!

Also, to determine if *conductive* heat exchange through the wall of the stove was being encouraged to an unhealthy extent, we checked the inside of the woodburner's firebox each day for increased creosote accumulation. We found no difference in the appearance or depth of the deposits on any of the four walls, which suggested that the exchanger was receiving mostly *radiant* energy from the exterior stove wall. (The ceramic may have exerted some insulating effect, counterbalancing increased conductivity.)

How much hot water will the exchanger produce? Well, during a typical seven-hour cycle we would load 55 to 60 pounds of wood into the Atlanta Catalytic, which would boost the 42-gallon tank's contents to just short of 140°F. This eight-pound-per-hour burn rate is probably somewhat higher than most folks use, so the volume of hot water that you might get from a similar unit could be slightly less. Of course, if you maintain a strong burn all day long, the total over a 24-hour period should still be more than 100 gallons per day of plenty-hot water. And even if you often operate your stove in a "closed down" condition, the system will significantly reduce your water-heating bill.

Depending on the size of your family and the amount of water each person uses, the system could *eliminate* your wintertime hot-water bill. Consequently, if you're able to get your wood at a price that's substantially lower than that of an equivalent amount of electricity or gas, the energy you put into warming water from your woodstove (which, of course, *will* be subtracted from the space heat the appliance would have delivered) will be well worth the investment. Besides, you'll have the satisfaction of knowing that you've taken one more step toward replacing nonrenewable sources of energy.

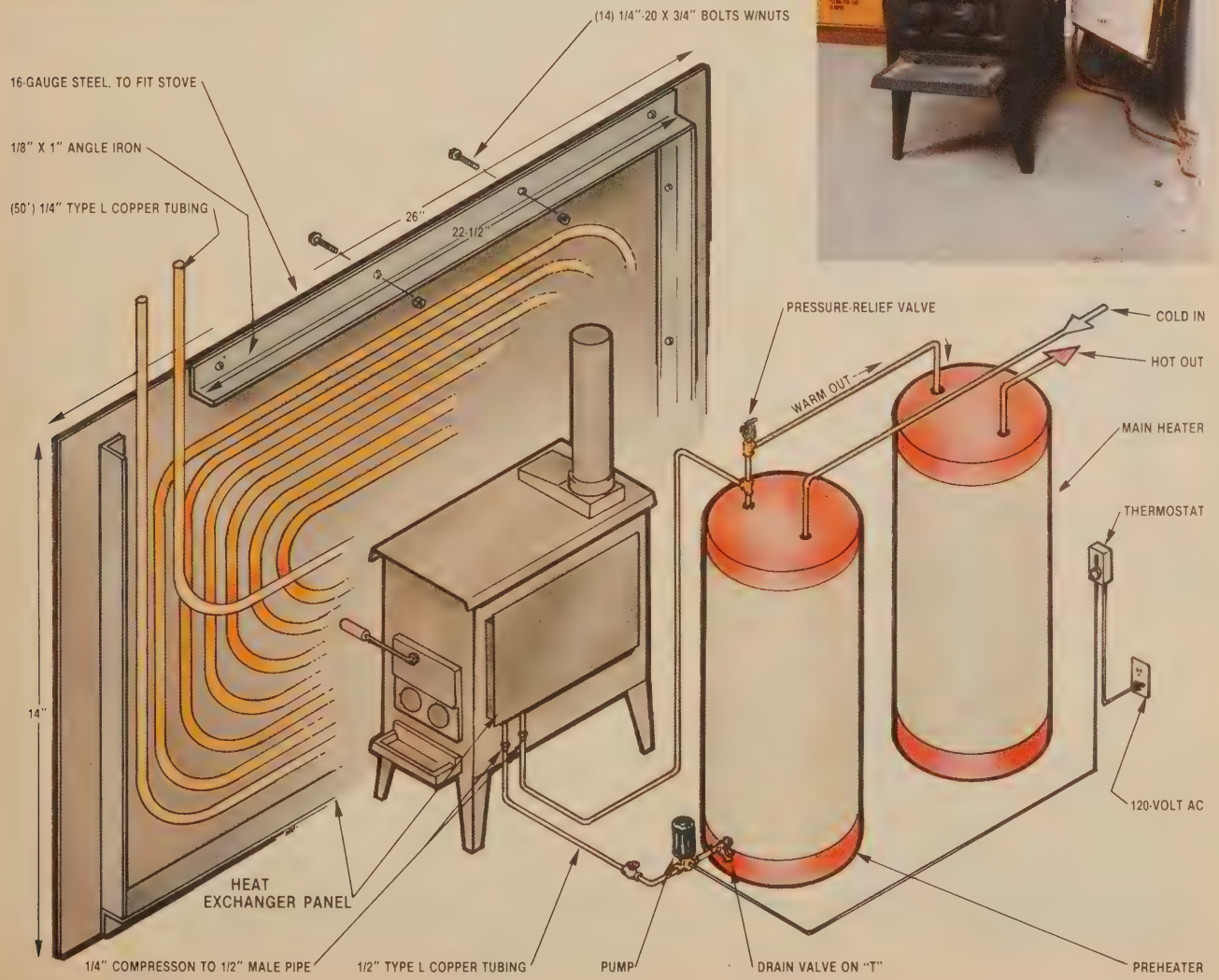
BILL OF MATERIALS

pump (Richdel R798)	$60.00
thermostat (Dayton DE158)	20.56
(50') 1/4" Type L copper tubing	12.50
16-gauge 2' X 3' steel	5.00
(8') 1/8" X 1" angle iron	5.00
pressure-relief valve	6.00
(14) 1/4"-20 X 3/4" bolts w/nuts	3.50
(3 qt.) plaster of paris	7.50
(6') baling wire	0.25
miscellaneous plumbing	15.00
TOTAL	$135.31

FAR LEFT: First, the coil of copper tubing is positioned inside the angle-iron frame. LEFT: Then plaster of paris is worked in around the tubing. LOWER LEFT: Water warmed in the coils is piped to a storage tank that feeds into the main heater. BELOW: The assembly simply bolts to the side of the woodstove.

STAFF PHOTOS

WOODSTOVE WATER-HEATING ATTACHMENT



Foraging for nutritious native edibles doesn't have to be a fair-weather activity!

A WINTER WILD-FOOD FEAST

James E. Churchill

In my opinion, the mark of a *real* wild-food forager is his or her ability to rustle up a square meal from nature's larder *in the dead of winter*. That's why, one cold day up here in northern Wisconsin—with the temperature hovering around 9°F—I decided to put myself and a neighbor's son (a young fellow who had never searched for native edibles before) to a test: Come dinnertime, we would either sit down to a hearty foraged feast . . . or go hungry.

Actually, I had another motive for my idea, too. I wanted to teach Muskrat (a nickname given my companion by his father, in reference to the lad's inborn affinity for water) the value of our region's wetlands as a source of food. I knew that streams and marshes are prime foraging territory year round . . . and I wanted to illustrate that important point to the youngster.

So Muskrat and I sat down to plot our strategy and decided that—with any luck—our menu that night would be a chowder of cattail shoots, watercress, and freshwater clams (actually a type of mussel found in this part of the country) . . . biscuits made from cattail-root flour . . . roast rabbit . . . and highbush cranberries for dessert. I figured that we could find all those goodies within walking distance. I suspect that Muskrat, on the other hand, probably wasn't quite so sure. Nevertheless, he grabbed his .22 rifle while I rustled up a plastic bag and a couple of pairs of insulated rubber "trapper's gloves". Then we headed off (dressed in appropriately warm garb, including watertight boots) for a nearby ice-free stream.

CLAMS 'N' CATTAILS

Even in these parts, where freshwater mussels abound, finding the succulent wildlings can be difficult if you don't know where to look. In the summer, I frequently search along the banks of streams until I come across shells left by marauding raccoons. Usually, two or three such remnants in the same place mean a clam bed is nearby. But during the winter, of course, snow covers the ground and hides the evidence.

So, Muskrat and I simply waded into the creek and headed upstream (that way, any silt we kicked up would be carried away behind us), peering intently into the water and feeling around on the bottom with our gloved hands for clam-shaped objects. Sometimes the little rascals are almost entirely buried in mud—with just the edges of their shells protruding—and sometimes they're lying flat, hidden among a seemingly infinite number of *rocks* of a similar form. But persistence generally pays off . . . particularly if you search (as Muskrat and I did) around the downstream sides of boulders or other large obstructions—or at the upstream end of a deep pool—where the diminished current drops floating food to the bottom and into the open mouths of waiting shellfish. Within a few minutes my young apprentice and I had extricated four good-sized freshwater clams . . . enough for our chowder.

[EDITOR'S NOTE: All bivalves are filter feeders and thus readily accumulate pollutants and pathogens in their bodies. It's important, therefore, that you forage shellfish only from pure waters.

Also, you should keep in mind that of the approximately 300 species of freshwater mussels in this country (nearly all of which are edible), 16 are included on the federal government's endangered species list . . . and others are protected on the lists of individual *states. Because these varieties are rare, your chances of coming across one on an occasional foraging outing are very slim . . . nevertheless, you should check with your state's wildlife or natural resources authorities before you go mussel hunting, just to see what the situation is in your locale. Some specific areas may be closed to the practice.]*

With the quartet of shells safely ensconced in our collecting bag (along with enough water to keep the bivalves submerged and fresh), we waded ashore and walked along the bank in search of cattails. We'd hiked only a few hundred feet when we came to a good stand of the plant, with its characteristically spiky, cornlike leaves poking out of the snow. When we cleared the white stuff away from a small patch and chopped through the ice below, we could see water about a foot deep.

Muskrat stuck a gloved hand into the marsh, felt around in the mud until he got a good hold on the ropelike roots of one plant, and with a mighty heave pulled the whole mass—roots, stems, and leaves—out onto the ice. He repeated the procedure twice. I chopped the roots from the stems and washed the mud from the skins and from the tender white shoots that tapered out of the brown rhizomes.

As we worked, I pointed out to Muskrat that chopping a hole in an ice-covered marsh is like opening the door to a winter pantry: Besides cattail roots and shoots, you can find crayfish, bullheads, frogs, turtles, arrowhead tubers, pond-lily roots, and a wide variety of other delicious wild edibles. Then I stuffed our cattail harvest into the bag, and we set out in search of the final ingredient for our chowder: watercress.

Now most fair-weather foragers are familiar with this pungent green, but not very many folks know that a well-established patch of watercress—which requires clean, cold water and fertile bottom soil in which to grow—will do quite well even in the middle of winter. I knew that we were close to a cress bed that—in the summer—covers nearly half an acre . . . and sure enough, when we arrived there, several good-sized bunches were waving in the incoming current of a little feeder spring.

Since watercress *looks* tough and well-rooted, Muskrat made a common mistake: Before I could stop him, he grabbed hold of several plant tops and tugged hard . . . and they pulled completely out of the soil, roots and all. I explained to him that since the roots are unpalatable, it's a much better idea to pinch or cut the plant off just below the leaves, leaving the roots intact to produce another generation of salad greens.

Anyway, with that lesson learned, we proceeded to harvest enough for our stew.

A SURPRISING EVENT

By the time we'd gathered our clams, cattails, and cress, we were ready for a break . . . so Muskrat and I sat down next to a big evergreen to soak up the afternoon sun.

Suddenly, a meadow mouse flashed out of its hiding place beneath a low-hanging snow-covered limb, and Muskrat—quick as a cat—reached out and caught the little animal in his gloved hand. The boy studied the vole (and vice versa!) for a minute or so, blowing gently on its fur to observe its thick winter coat. My guess is that this action probably deposited a strong human scent on the critter . . . at least, that's the only *reasonable* explanation I can think of for what happened next.

When the youngster put the mouse back down on the snow, the timid rodent ran straight into a nearby rabbit burrow to escape . . . and almost immediately we heard a terrific thumping and squealing down in the hole. A split second later, a cottontail squirted out of the opening, going so fast that it was literally airborne! Before we could fully grasp the situation, *another* rabbit flew out and joined its partner under a brush pile a short distance away.

Well, since rabbit was on our menu, we could hardly ignore this loud knock of opportunity. We loaded the .22, chased the rabbits out into the open, and quickly dispatched one while the other ran free.

Loaded down with our "groceries", we headed back home . . . stopping only long enough to pluck a supply of frozen cranberries from a bush studded with the tenaciously clinging bright red fruit.

MMM-MMM-GOOD!

Foraging for food on a cold winter's day is not only an interesting and enjoyable outdoor activity . . . it's downright *hungrifying*. By the time we got back to the old homestead and warmed ourselves by the woodstove, we were ready to *eat*, so we hurried to prepare our feast.

While Muskrat commenced skinning and cleaning our rabbit, I proceeded to whip up the chowder. First, I washed the cattail roots and snapped off the shoots, setting the brown ropy pieces aside to be converted into flour. Then I peeled the shoots and sliced them wafer-thin, and washed and chopped several sprigs of watercress. That done, I scrubbed the clam shells *very* thoroughly, and placed them, along with about 1/2 cup of water, in a pan on the stove. When the mussels had begun to open from the heat, I removed them and let them cool . . . pried the shells apart (I stuck a knife in past the lips and cut the muscle) . . . and excised the meat, holding the shells over the broth pan to catch any juices that ran out. In the summer, freshwater clams' stomachs are usually full of a black material that must be cut away and discarded, and the pot liquor and juices must be drained through a fine cloth to filter out impurities . . . but these wintertime specimens didn't seem to need such processing.

Next, I put the clam meat through a crank-type food grinder, again making sure to reserve the juice and add it to the broth. Then I put the "clamburger" into the pan with the pot liquor . . . added the sliced shoots and chopped watercress, along with a little salt and pepper . . . and placed the soup on the back of the stove to simmer.

By the time I'd finished the chowder, Muskrat had cleaned and cut the rabbit into six or seven pieces and was shaking the washed, drained chunks of meat in a bag containing whole wheat flour and a bit of salt. He then browned the flour-coated pieces in a skillet with just a little butter, put the meat in a deep baking dish, and placed the dish in the oven (which we'd preheated to about 300°F) to bake for 1-1/2 hours.

The next job on the list was to make cattail-root flour for our biscuits: I cut the washed roots into six-inch lengths, put the chunks through the food grinder (after cleaning out the clam meat, of course), and spooned the fibrous mash into a pan filled with cold water. In a few minutes the root fibers and skin floated to the top, while the heavier starch—the "good stuff"—remained on the bottom. I simply skimmed the debris off with my hand, carefully poured the water away, and there was my biscuit flour. Some folks might want to repeat the grinding/floating process—to refine the product a bit more—and many foragers prefer to dry the moist starch before using it. But since all dough recipes call for the addition of liquid anyway, I just go ahead and use the damp, "fresh" starch, mixed half and half with toasted whole wheat flour.

At this point, I must admit, the enticing aroma of the simmering soup and the roasting rabbit had set our stomachs to growling like a pair of hungry puppies, so I wasted no time at all in putting together a batch of biscuits. Here's the recipe I used: Mix together 1/2 cup of cattail-root flour, 1/2 cup of toasted whole wheat flour, 1 teaspoon of baking powder, a dash of salt, and—if necessary—some water, to make a sticky dough. Then form the batter into half-inch-thick palm-sized patties and fry them in just a bit of corn oil in a skillet until they're golden brown.

Of course, we still had dessert to prepare too, so I put the hot biscuits in the warming oven while Muskrat washed and stemmed our foraged cranberries. I then poured the fruit and enough water to cover it in a pan and simmered the berries until they burst open and released their juices. Next, I added enough honey to sweeten them . . . stirred in some powdered gelatin (2 teaspoons of gelatin for every pint of liquid) . . . and put the sauce into the refrigerator to cool. I knew that by the time we'd eaten our dinner and given our stomachs an hour or so afterward to rest, the delicacy would be firm and ready to serve with whipped cream. Yum!

A MEMORABLE MEAL

I don't think I have to tell you we *didn't* go hungry that night. Even more satisfying than the hearty meal, though, was the feeling of accomplishment: Not only had we successfully foraged a nourishing meal from the "barren" winter landscape, but—in the process—we'd also learned a little more about, and grown closer to, the natural world that supports us. ●

HIGHBUSH CRANBERRY

CATTAILS

WATERCRESS

They're designed to keep the cold out . . . but you can use 'em to bring the warm in, too!

STORM WINDOW SOLAR PANELS

Over the years, MOTHER's staff tinkerers have come up with a variety of solar devices, most of which have been designed for those who want to give the sun a try without incurring a lot of expense. But then—after all of our past efforts—whenever we tried to come up with some original solar projects, we were stumped for ideas. (Was there really nothing—more—new under the sun?)

But all of a sudden, MOM's researchers hit upon the idea of using salvaged aluminum *storm window frames* as the basis of a low-cost, weather-resistant, simple-to-assemble hot-air collector . . . and a promising —economical—approach to backyard solar technology was born. After all, the triple-trackers seem almost *custom-suited* to the application, since they're [1] preformed in perfect shallow "collector shape" . . . [2] made of lightweight, durable, *heat-resistant* material (a stagnant *wooden* collector can, over time, start to smolder) . . . [3] already equipped with precut, tight-fitting glass . . . and [4] commercially fabricated, giving them a finished "marketplace" appearance.

On top of all this, secondhand frames—at least the ones appropriate for this project —can often be obtained for a few bucks apiece. Many people are upgrading their windows' weatherizers with new or color-coordinated storm fixtures . . . meaning that plenty of old-but-sound frames are finding their way into the trash or to salvage houses. Even sashes that are missing a pane can be recycled. In fact, a shrewd buyer could probably pick up such "worthless" castoffs for next to nothing and replace the damaged glass with sheets cannibalized from other junk windows!

However you acquire the materials for a storm window solar panel, all that *does* matter is that you locate two frames of the same size and come up with enough glazing to seal one of them tightly. Remember, though, that it's to your advantage to search for large units (they don't have to fit your own home's windows), since they'll naturally offer more absorber surface area.

Once you've latched on to one or more pairs of equal-sized storm sashes, you'll need only to come up with a few more items—which we've specified in our list of materials—to make your solar project a success. The back of the collector *and* its absorber is a single sheet of 1″ foil-faced rigid foam insulation board. The inlet and outlet ducts consist of 4″ holes cut in that board at opposite ends. A thermostatically controlled box fan draws air through the collector and exhausts it into the room. And a couple of clothes-dryer fittings, some flexible hose, and a channel made from sections of insulation board complete the connection between the air ducts in the collector and those in the living area.

To attach your solar storm window as effortlessly as possible, you'll probably want to use an installation similar to the one shown in our photographs. The collector mount is an adjustable board assembly designed to fit in the tracks of any partially open double-hung window. Once the sash is closed tightly against this insert (foam stripping at the joint will assure a weathertight seal), it's sturdy enough to support the weight of the solar panel on the two brackets extending from its outside face. To help

CLOCKWISE FROM ABOVE: Because the collector is made from storm window frames, it'll match the exterior of almost any home. . . . Foil-faced insulation board makes up the panel's rear surface. . . . The collector's tubular framework hangs from a pair of shelf brackets. . . . An adjustable insert makes for easy installation.

STAFF PHOTOS

give the aluminum collector walls some structural support, a tubular framework is fastened to the edges of the panel "sandwich" . . . and to hold the unit at an optimal angle to the sun, a pair of rubber-tipped legs stretch between the frame and the house's exterior.

Begin construction of the collector by laying a screenless and windowless aluminum frame mounting face up on a flat surface. Measure the width and height of the sash opening (where the framed glass panes normally go), and then cut your foil-covered insulation board to those dimensions, using a utility knife.

Next, cut a 4"-diameter opening in one corner of the board (be sure to leave at least an inch or so margin from the edges), then remove a 4"-square plug from the sheet's diagonally opposite corner. By slicing three long, narrow strips (two 2" wide and one 6" wide) from your leftover insulation material and using aluminum foil tape to join those pieces together, you can then make a simple heat-retaining passageway between what will be the collector's lower—intake—duct and a point about 3 inches from its upper one. (We found that the easiest way to do this was to first determine the tunnel's necessary length, cut the strips to fit, join them in a three-sided channel, and then tape the entire assembly to the surface of the board *after* that insulation sheet had been installed within its aluminum frame.)

Before you do that, though, it'd be a good idea to put the square-to-round dryer-duct fitting you purchased in place over its upper corner opening and secure it with some silicone sealant. Then you can go ahead and coat the absorber surface with high-temperature flat black paint and complete the installation, again using a continuous bead of silicone sealant as a bond. With that done, it's a simple matter to secure the insulated channel—making sure the lower duct is covered—and trim out some end caps that'll fasten neatly over the tube's open tips. (A strip of foil tape placed over each 4" duct's cut edge will protect the foam insulation from the long-term effects of heat.)

The dryer vent kit you bought should contain about 10" of sheet-aluminum pipe. Cut several inches from it and install it in the upper end of the channel. The remaining piece of pipe can be cut in half and used later on.

At this point you can join the glass face to the collector frame. First, check to make certain the panes are locked securely in their slots, then go ahead and seal all of the joints—including the one between the windows—with silicone. Run a bead of caulk (or lay sections of weatherstripping) along the frame's faces, then fasten the halves together at the top and bottom flanges with some bolts or self-tapping screws. Take care to orient the glass so the upper pane *overlaps* the lower and thus sheds rainwater rather than catching it.

The tubular framework that helps to hold the collector at the correct sun-catching angle is constructed of appropriate lengths of 1/2" electrical metallic tubing (E.M.T.). Five-foot-long side rails were just about right for the 36" X 62" frames we were working on. With those bolted through the right and left edges of the storm fixtures so that about 2" of E.M.T. protruded above both top sides of the collector, it was easy to determine the length of conduit necessary to connect those two stubs. The joints were secured by cutting the heads from two 1/4" bolts and bending hooks in their shanks. These "claws" could then be slipped into holes drilled in the cross pipe, and their threaded ends could be passed through openings bored in the side rails and secured with nuts.

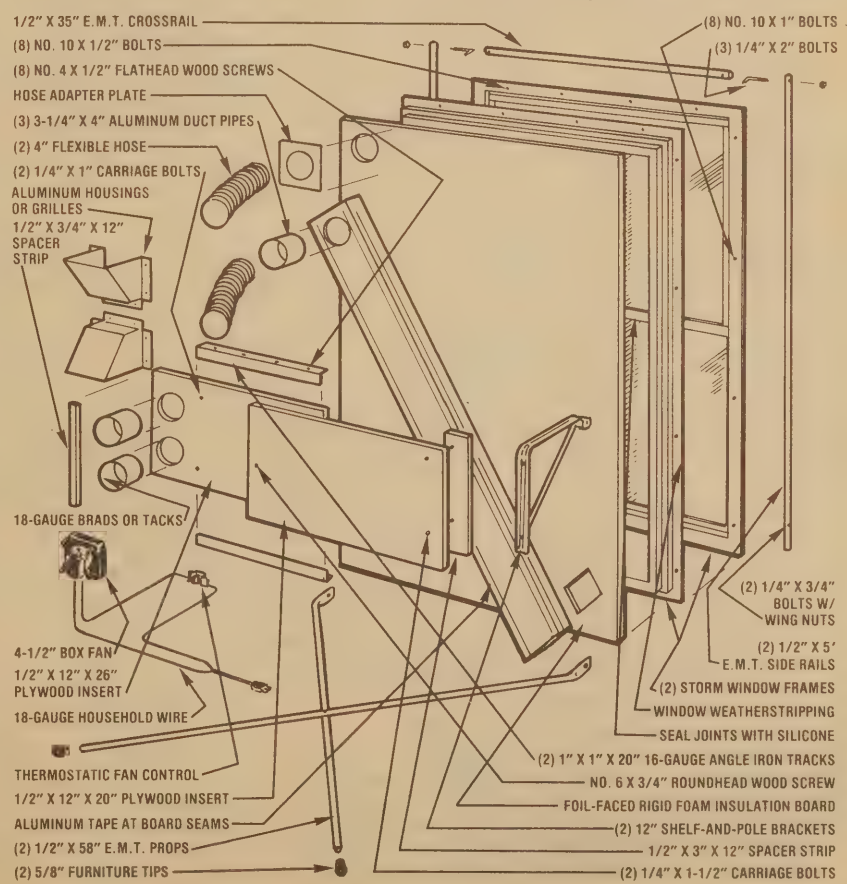
At the lower ends of the two side rails, wing nuts slipped inside each tube served as a "catch" for the 1/4" X 3/4" bolts that hold the lower support legs in place. Those 1/2" E.M.T. props are offset at one end so they'll crisscross—and bolt together—in the middle for added stability. (Naturally, the dimensions of this "X" brace will depend upon the size of your completed collector *and* your home's latitude. Just remember that the ideal winter angle for your sun grabber's surface is that latitude plus 10°.)

Congratulations! The collector itself is now complete . . . so it's time to move on to the insert that fits in the grooves of your home's window. This wooden "plug" supports the collector from the top *and* houses the blower fan, along with the air supply and return ducts. To make it, simply cut a section of 1/2" plywood to 12" X 20" and 12" X 26" dimensions, then fasten a 1" X 1" X 20" piece of 16-gauge angle iron to each edge of the longer board—flush with one end—so the other slab can slide snugly into the track you've created. Bolster the outer ends of each board with 1/2" spacers (the long one will take a 3/4"-wide strip, and the short one a hunk about 3" wide) tacked in place on sides opposite each other.

(continued on next page)

LIST OF MATERIALS

- (2) matching aluminum storm window frames (one with unbroken glass)
- 4' X 8' sheet of foil-faced rigid foam insulation board (polyisocyanurate)
- clothes-dryer vent kit, which should contain the following parts:
  - 4"-diameter flexible hose
  - 4" X 10" sheet-aluminum duct pipe
  - hose adapter plate
- (3) 1/2" X 10' E.M.T.
- (2) 5/8" rubber furniture tips
- 4-1/2" box or muffin fan (110-volt AC) with a 65-110 CFM flow
- 6-amp warm-air differential fan control (White-Rogers Part No. 757-1)
- 10' 18-gauge household wire w/plug and wire nuts
- 1/2" X 12" X 46" plywood sheet
- 1" X 1" X 40" 16-gauge angle iron
- 1/2" X 3/4" X 12" wooden spacer strip
- 1/2" X 3" X 12" wooden spacer strip
- (2) 12" shelf-and-pole brackets
- (8) No. 10 X 1/2" bolts or self-tapping screws
- (8) No. 10 X 1" bolts
- (3) 1/4" X 2" bolts
- (2) 1/4" X 3/4" bolts w/wing nuts
- (2) 1/4" X 1" carriage bolts
- (2) 1/4" X 1-1/2" carriage bolts
- (8) No. 4 X 1/2" flathead wood screws
- No. 6 X 3/4" roundhead wood screw
- 18-gauge brads or tacks
- high-temperature flat black paint
- silicone sealant
- rubber door and window weatherstripping
- aluminum foil tape


1/2" X 35" E.M.T. CROSSRAIL
(8) NO. 10 X 1/2" BOLTS
(8) NO. 4 X 1/2" FLATHEAD WOOD SCREWS
HOSE ADAPTER PLATE
(3) 3-1/4" X 4" ALUMINUM DUCT PIPES
(2) 4" FLEXIBLE HOSE
(2) 1/4" X 1" CARRIAGE BOLTS
ALUMINUM HOUSINGS OR GRILLES
1/2" X 3/4" X 12" SPACER STRIP
18-GAUGE BRADS OR TACKS
4-1/2" BOX FAN
1/2" X 12" X 26" PLYWOOD INSERT
18-GAUGE HOUSEHOLD WIRE
THERMOSTATIC FAN CONTROL
1/2" X 12" X 20" PLYWOOD INSERT
ALUMINUM TAPE AT BOARD SEAMS
(2) 1/2" X 58" E.M.T. PROPS
(2) 5/8" FURNITURE TIPS
(8) NO. 10 X 1" BOLTS
(3) 1/4" X 2" BOLTS
(2) 1/4" X 3/4" BOLTS W/ WING NUTS
(2) 1/2" X 5' E.M.T. SIDE RAILS
(2) STORM WINDOW FRAMES
WINDOW WEATHERSTRIPPING
SEAL JOINTS WITH SILICONE
(2) 1" X 1" X 20" 16-GAUGE ANGLE IRON TRACKS
NO. 6 X 3/4" ROUNDHEAD WOOD SCREW
FOIL-FACED RIGID FOAM INSULATION BOARD
(2) 12" SHELF-AND-POLE BRACKETS
1/2" X 3" X 12" SPACER STRIP
(2) 1/4" X 1-1/2" CARRIAGE BOLTS

MUST LIQUIDATE
Catalytic Wood Stove
At FAR BELOW dealer cost! And even BELOW manufactured cost!

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Now SAVE Over $700 Due to Financially Distressed Inventory!

One of the nation's largest manufacturers of stoves made this advanced design under a private label for a marketing firm. The marketing firm ran into financial difficulties, so the manufacturer refused to deliver this shipment.

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First it burns the WOOD! Then it burns the GASES! Catalytic converter, with precious Palladium and Platinum, helps produce amazing 86-90% efficiency! It's the BEST you can buy!

Here's your "buy of a lifetime" on a superb stove! It's the SAME model that sold in major chain stores for over $700 MORE than OUR low liquidation closeout price!

3 Combustion Stages!

Highly advanced design provides primary and secondary combustion stages . . . plus a THIRD stage! The third stage utilizes scientific catalytic action to produce burning efficiency that is extremely high!

Catalytic System!

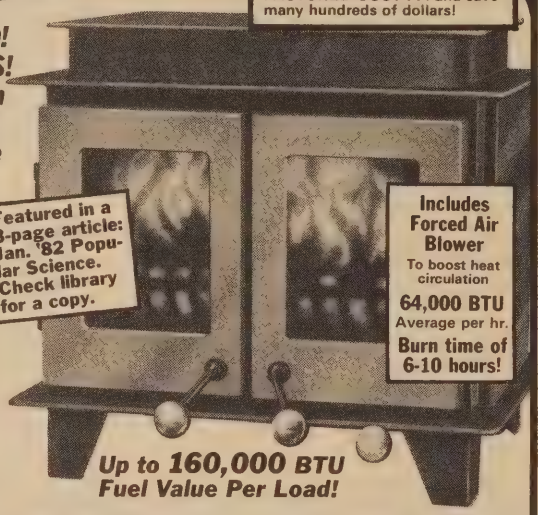
Precious palladium and platinum are used in a catalytic coating on a ceramic "honeycomb" afterburner. This reduces normal high ignition temperatures of waste gases so they can be burned for EXTRA heat. You get MORE heat from LESS wood!

No Creosote Problems!

Because most of the waste gases are burned up, hazardous creosote buildup is virtually eliminated. The chimney stays very clean. About all that goes up the chimney is harmless carbon dioxide and moisture.

This remarkable stove even provides high efficiency with cheaper softwoods and partially seasoned wood. (MORE savings for you!)

Primary intake of room air can be precisely adjusted. Automatic baffle bypass provides safe, smoke-free startups and refueling. Preheating of air in a manifold maintains necessary temperatures for complete combustion.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64,000 BTU
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Burn time of 6-10 hours!
Up to 160,000 BTU Fuel Value Per Load!

- Double wall construction gives more effective insulation.
- 1/4" steel plate construction for fast heatup; rugged durability.
- A THIRD wall around 2/3 of the stove for EXTRA insulation and convection heat.
- Calibrated control lever for precise increments of room air to be drawn into manifold for desired temperature control.
- Viewing porthole lets you monitor Catalytic System to see if any minor adjustments are desired.
- Burn time can be increased by "slowing down" fire and STILL keep almost perfect combustion.

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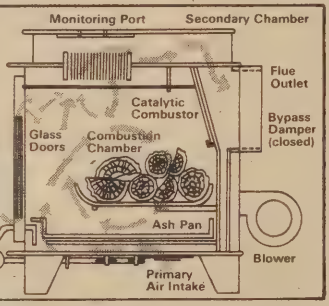
Offer void outside continental U.S. Be sure you have enough people to unload the wood stove upon delivery. Price subject to change after 60 days.

Super efficient Catalytic System lowers ignition point of escaping gases from 1300°F range to about 500°F. This allows stove to burn gases as fine fuel for EXTRA heat! You get more BTU with less wood.

With primary and secondary air controls, the air and fuel ratio can be kept near perfect for both high and low fires.

Gasketed air-tight doors have inner AND outer panels of hi-temp glass for insulation.

Special inlet under hearth is safety feature to extinguish fire in stove if Catalytic System clogs due to improper usage.



Avg. heat output .... 64,000 BTU/hr
Fuel value per load .... 160,000 BTU
Burn time ..... 8 to 10 hours
Size ..... 28"H x 30"W x 23½"D
Weight ..... approx. 380 lbs.
Flue diameter ..... 8"
Height to flue bottom ..... 15⅝"
Door opening ..... 14" x 22⅝"
Catalytic combustor 2600°F rated
Log size capacity ..... 24"
Fire box size ..... 17"D x 25¼"W
Heating capacity ...10,000 cu. ft.
Ash pan... heavy-duty, removable
Wood grate ..heavy-duty cast-iron

Safety approvals: Tested to UL standards by the Gas and Mechanical Laboratories. ICBO listed on report No. 3558.

For name of the major U.S. stove manufacturer... and for full factory warranty details, call Toll-Free.

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If busy signal or if no answer, call:

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Rural Route Customer: If truck carriers do not normally deliver to your home, include note with this order, stating town address of nearest store, friend or truck terminal to ship to.

(continued from preceding page)

Next, using your two remaining dryer duct pipes as templates, trace and cut out openings in the longer piece of plywood that are 2-1/2 inches apart and at least 2 inches from the window-frame end of the board. Seal and tack the metal collars into these holes so they extend to the home's outside (away from the angle iron tracks), then bolt a shelf-and-pole bracket to each of the sliding boards. (Fasten one to the 1/2" X 3" X 12" spacer, and the other about 2 inches to the inside of the ducts.) A No. 6 X 3/4" roundhead wood screw threaded through the interior panel and forced into the exterior one will keep the sliding insert from slipping once it's placed within the window tracks.

The way you utilize your blower fan is a matter of preference. If it has limited delivery (under 100 cubic feet per minute), it can be mounted to the upper insert duct and connected, with dryer hose, to the fitting on the collector's air channel. This will draw air in from the middle of the room, feed it to the bottom of the collector, allow it to flow upward along the absorber face, exit it out the corner duct, and return it to the house via the dryer hose connected to the lower window vent. Alternatively, if your fan has more than enough capacity, it can be fastened over the lower window duct and used to *suck* air through the system, with the supply and return tubes *reversed*. This will slow down the flow—and further heat the air—but be forewarned that you'll sacrifice some efficiency by doing so.

Either way the fan is mounted, its thermostatic control should be wired in, as shown in our diagram, and that unit should be fed through the corner duct tube and allowed to rest on the absorber surface. Some protective housings—bent from sheet aluminum like those shown in the photo—can be used to cover the window vents if you want to avoid the expense of purchasing louvered grilles . . . and homemade foam-rubber plugs will keep those openings from leaking cold air in the evenings. (If you live in a particularly cold climate, you'll also want to insulate the dryer hoses by wrapping batts or foam around them and covering that with duct tape. You could also seal the joints between the insert and the window with weatherstripping . . . and you might even want to glue scraps of insulation board to the surface of the plywood.)

Are the storm window suncatchers worth building? You'll have to answer that question for yourself. Each of the three units we completed cost us, on the average, under $50 to build, with all materials being new except for the windows. We expect the heaters to last for at least five years. And our initial tests indicate that on a clear or partly cloudy day they're capable of delivering 120°F air to the house for perhaps six hours.

We're not about to tell you that storm window collectors are *super*-efficient . . . but they definitely do work and are among the simplest-to-make collectors you could ever build. Yes sir, for the value of time and materials that you'll put into them, these "Btu bargains" just might be among the nicest introductions to bootstrap solar technology that you'll run across!

NOTE: If you prefer not to cut this page, you may order on a separate sheet of paper. Please mention MOTHER when you do.

PROFILES

In celebration of folks involved in MOTHER-type doings around the world.

JIMMY LEE SUDDUTH: PRIMITIVE ARTIST

Since his childhood, Jimmy Lee Sudduth has had a love for art. But not until 12 years ago, when he retired from doing field work and odd jobs, was Jimmy able to devote his life to painting. Now, the 72-year-old Alabamian is praised as his state's most outstanding primitive artist.

Sudduth looks to nature for the materials needed in his work. Clay mixed with water and sugar serves as his paint, and he uses more than 20 hues of the earthy substance . . . with shades ranging from rust and mustard to gray. Jimmy also derives needed colors from ivy, turnip greens, lilies, and walnut shells. Instead of the conventional paintbrush, he uses a stick or simply applies the paint with his fingers. And his "canvas"

PHOTO BY THE AUTHOR

is far from ordinary: It might be a piece of plywood or tin, the back of a street sign, or an old door.

By pursuing his lifelong dream, Sudduth has become the best-known citizen of Fayette County, Alabama. In 1976, he participated in the Festival of American Folklife, which was sponsored by the Smithsonian Institution in commemoration of the nation's 200th birthday. Jimmy has also been the star of many art exhibits across the South, where he's repeatedly delighted observers with treasures created from the Alabama wild.—*Nancy Callahan.*

SISTER JOAN CHITTISTER: A PRIORY'S PRIORITY . . . ALTERNATIVE ENERGY

Joan Chittister is a Catholic nun and prioress of the Mt. St. Benedict complex in Erie, Pennsylvania. Members of the Benedictine order have traditionally been concerned with the preservation of the earth and the just distribution of resources, and Sister Joan believes that a good Benedictine should ask, "What does this planet need now?" Her *own* inquiry led to a decision to work toward energy conservation.

Because of Sister Joan's efforts, a 2,700-foot gas well was drilled for Mt. St. Benedict in 1980, and natural gas now provides the priory with 55% to 60% of the fuel needed for heat, hot water, and cooking. But Chittister didn't stop there. In November of 1982, a three-bladed windplant was installed. The Benedictines' Director of Resource Development, Sister Pat Lupo, states that the unit—in its first winter of operation—supplied 80% of the electricity for the religious order's Glinodo Conference Center. Now, Sister Joan and her nuns are investigating solar energy.

Since people are willing to go to war for oil, the sisters see the utilization of alternative energy sources as a contribution toward world peace. And the Erie Benedictines are happy to be "making good use of the things God has given us".—*DM.*

ROBERT OUTMAN: BEAGLES AT WORK

The beagle has traditionally been the hunter's helper . . . but Robert Outman is making use of the animal's acute senses to aid the homeowner. In 1979, the Belmont, California resident began training beagles to sniff out *termites*. Today he has 23 dogs working to detect the wood-chewing insects, which—according to a study conducted by Texas A & M University—do more than a billion dollars' worth of damage in the U.S. each year.

The typical human termite inspector examines a building for evidence of damage, and listens for the insects while probing in sections of the structure that are suspected of being infested. But Robert's beagles, after a rigorous training program, are able to

PHOTO BY ROSEMARY HOOD

discover termites that would go unnoticed by the two-legged inspectors. The sensitive dogs can actually *smell* the insects and can also hear them munching away behind walls that appear to be sound. Because of the beagles' skill in pinpointing the pests, chemical fumigation of an entire home is often unnecessary . . . only the parts known to be affected need be treated.

The beagle trainer believes that high technology is not necessarily synonymous with progress, and that overkill with chemicals is a step backward. As Outman puts it, "What better way to combat one of nature's most destructive elements than with a natural opponent?"—*Philip W. Leon.*

IN BRIEF . . .

Dr. ARNOLD BORER, visiting scientist at the W. Alton Jones Cell Science Center in Lake Placid, New York, is doing research on the regenerative capacity of the earthworm. He'd like to integrate his findings into field studies that could be used to determine the toxicity, to earthworms and other soil organisms, of various agricultural chemicals (more than 8,000 of these substances are in use today). Dr. Borer—whose Ph.D. in General Physiology and Microbiology is complemented by many years of practical agricultural experience—hopes that his research will provide the knowledge people need in order to "keep our soil from becoming polluted to the degree our air and water are now".

Dr. CHRISTOPHER HILLS, author and editor, is a leading proponent of the highly nutritious alga *Spirulina* (turn to page 180 of MOTHER NO. 68 for information on this remarkable food). In order to research, develop, and promote the healthful organism, Dr. Hills founded Microalgae International. Although the company is now the world's largest producer and distributor of *Spirulina*, Hills's prime objective is not personal financial gain. Rather, he is dedicated to creating global awareness of *Spirulina* as a means of fighting world hunger. Indeed, in one recent year, Christopher's company donated—through the Emergency Relief Fund International—$1.6 million worth of products to needy people in the U.S., India, Haiti, and El Salvador.

The conservation society Friends of Nature presented its 1983 Conservation Award to DAN HEMENWAY of Orange, Massachusetts. Hemenway is a teacher and practitioner of permaculture—a productive, ecologically responsible system of food landscaping (see MOTHER NO. 77, page 82)—and is the editor of *The International Permaculture Seed Yearbook 1983.*

Last October, ZUBIN MEHTA conducted violinist ITZHAK PERLMAN and singers JESSYE NORMAN and KATHLEEN BATTLE in a classical concert sponsored by Musicians Against Nuclear Arms (MANA). More than 200 professional instrumentalists and vocalists—including members of the New York Philharmonic and the Metropolitan Opera—participated in the program. Earl Kim, president of MANA, called the event "a musical statement of concern by musicians about the dangers of the nuclear arms race". Proceeds from the concert went to Physicians for Social Responsibility and the Nuclear Weapons Education Fund, both of which sponsor educational programs to increase awareness of nuclear weapons issues.—*DM.*

MOM'S MARKETPLACE

A listing of new and noteworthy products that might interest MOTHER's readers.

CLOSED FOR THE WINTER:

Parishutters (Parishutter, Inc., Dept. ME, 201 N. Wells St., Chicago, Ill. 60606) are exterior-mounted rolling shutters that not only reduce winter heat-transfer, but also help protect against severe weather, vandalism, and noise . . . while increasing privacy. Made of rigid PVC slats, Parishutters have an anodized-aluminum bottom slat with an automatic locking device that prevents opening from the outside. They can even be partially opened—while remaining locked—to control light and air circulation. For more information or the name of a dealer near you, write the company or call 312/726-6126.

AHHH . . . WARM FEET:

Do you suffer from that chronic wintertime ailment "cold tootsies"? You should give WarmFeet, a natural herbal formula, a try! Sprinkle this powder—made of capsicum, zingiber, and brassica seeds—into your socks, and it'll keep your feet warm all day . . . or as long as you want. The product, marketed through Divajex (the same company that makes Blue-Ice for keeping things cold), was developed by Samantha Stevens in her Aspen, Colorado kitchen. You should find WarmFeet in ski shops and sporting goods stores (or call 800/854-0175 for ordering information).

TALC-FREE BODY POWDERS:

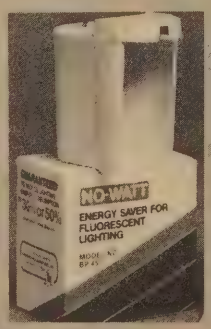
People sensitive to talcum powder will be glad to know that a small company in California is making pure *herbal* skin-care products. All Suméru Garden Herbal Body Powders have arrowroot as a base . . . with added scents from herbs and spices. Lavender Rose incorporates French lavender and roses . . . Eastern Forest contains sandalwood . . . and Loving Hands (made especially for babies) is very gently scented. Send $3.50 for a three-ounce size, or 45¢ for each quarter-ounce trial size of your choice to Suméru Garden Herbals, Dept. ME, P.O. Box 2847, Santa Cruz, Calif. 95063.

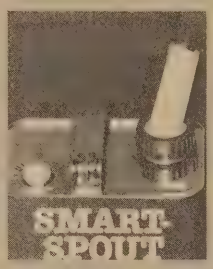
GIVE ME SOME AIR:

The McKillop Heat Exchanger Chimney (Energy Saver Products, Dept. ME, 411 N. Minnesota Ave., Sioux Falls, S.D. 57102) will expand the functions performed by your chimney. It's especially useful in snug, newer homes that suffer from a lack of fresh air in wintertime. First, the McKillop saves energy by reclaiming heat that normally exits out the smokestack. Second, the multipurpose flue reduces air stagnation by drawing cool air from the outside, warming it, and circulating it back through the existing furnace or woodstove. The company claims that the heat-exchanger chimney saves enough in yearly heating bills to pay for itself in three years or less. Write E.S.P. for more details.

NO WASTED WATTS:

Now, there's an energy-saver designed for *fluorescent* lights, and it's as easy to use as those little "juice reducer" rings you put on incandescent bulbs. No-Watt, which snaps onto the end of one of the tubes in a fixture, is a compact electrical device made of Mylar. Correct Phase Electronics, Inc. (Dept. ME, 1340 Hill St., El Cajon, Calif. 92020), which markets this product, claims that if the No-Watt doesn't reduce power consumption on each fluorescent lighting fixture by 30%, you can get your money back. Each unit costs $14.95 plus $1.50 for shipping and handling, and fits most 4′ and 8′ fluorescent tubes. Order from the company or call 800/227-8321.



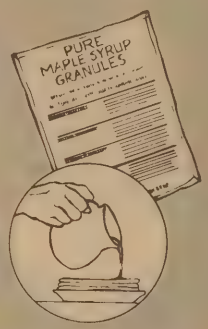


PERFECT POURING:

There's now a fuel pour spout that has a no-spill, no-overfill tip—it's similar in function to the self-shutting gas nozzles at service stations—and C.X. Products (Dept. ME, P.O. Box 355, Salem, Ohio 44460) sells it. The tip closes automatically when you fill a tank *and* seals the fuel can it's on. You should be able to find this safe and useful item in major hardware stores or wherever fuel cans are sold. If you're unable to locate the Automatic Fuel Spout locally, write Clay Tice at C.X. Products for advice.

HI-TECH MAPLE SYRUP:

Oh boy, maple syrup granules! A new process evaporates the water from real maple syrup to make these versatile and tasty crystals. The unadulterated end product is ideal for food reserves or camping trips: You can use Pure Maple Syrup Granules sprinkled on toast, yogurt, or fresh fruit . . . for baking . . . or simply reconstituted into liquid maple syrup. Green Mountain Endeavors (Dept. ME, 12 South View Dr., South Burlington, Vt. 05401) claims that the granules contain higher amounts of potassium, calcium, magnesium, phosphorus, and manganese than honey, yet have only a tenth as much sodium. Send $5.50 plus $1.50 postage for a 14-ounce bag.



ON THE LEVEL:

Did you ever try to level a set of deck supports when those posts were all six or seven feet high and five or six feet apart? How about making sure that the concrete floor for your new garage was perfectly horizontal? If undertaking such projects all alone has you stumped, try the Level-Master (PNS Engineering Co., Dept. ME, 101 McDonald Dr., Rockingham, N.C. 28379). The company claims that, using this unique instrument, one person can level points up to 100 feet apart . . . over obstacles, around corners, while standing high on a ladder, or even when down in a ditch. The complete package goes for $19.95 plus $2.00 for shipping and handling.

HOME WELDER:

We've experimented with the Lumiweld aluminum repair process here in our research department and find that, on a small scale at least, it works surprisingly well. It's especially convenient for the do-it-yourselfer because it doesn't require lots of expensive equipment: A gas-fueled torch will heat the metal enough for you to use the special rods that are the basis of this unconventional welding process. A $15 Lumiweld kit includes four rods (72 inches' worth), a stainless steel "toothbrush" for cleaning the surface, a Lumibrade (a stainless steel wire pick sometimes needed for scraping away oxides), and full instructions. Order from Alumismiths, Inc., Dept. ME, P.O. Box 517, DeLand, Fla. 32720.

MAKE YOUR DOUGH IN A HOMEMADE TRAY:

Homebaked bread is bound to taste better when it's been mixed and kneaded in a hand-hewn dough tray. The quality bowl shown here is cut from tupelo-gum wood and kiln-dried for 72 hours. What's more, the family that makes these lightweight, lifetime-guaranteed trays has been doing so for five generations! Since this $19.95 item is —obviously—*not* mass-produced, allow four to six weeks for your shipment to arrive. Order, for the list price plus $3.00 shipping and handling, from D.J.M. Distributors, Dept. ME, P.O. Box 1924, Laurinburg, N.C. 28352. ●

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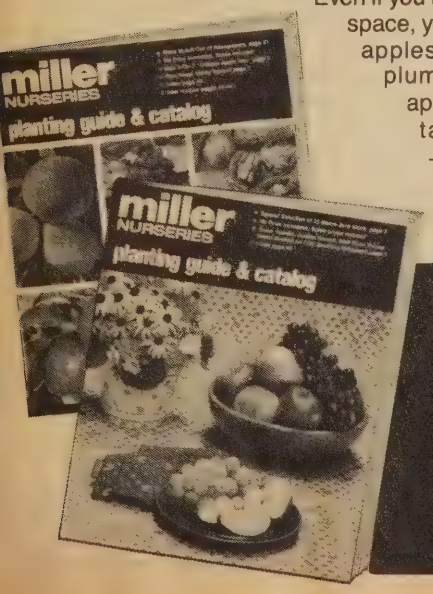
Big, bright, colorful, winter-hardy! That describes Miller's introductions for 1984. A new and special apple, our *Compspur Granny Smith,* is grass green. Another apple is (believe it or not) lustrous black. Our re-introduced old-tyme varieties are gold, red, and green. Our 5 new strawberries are "berry, berry red." And our new recipes will make your mouth water!

No Yard Is Too Small For Miller's Dwarf Hybrid Trees

At "apple blossom time," our dwarfed hybrid trees decorate your grounds with fragrant pink, white or many colored blooms. At harvest time, you bite into fruits and nuts so rich in flavor they make store-bought varieties taste like cardboard. Even if you have postage-stamp space, you can grow full-size apples, peaches, pears, plums, cherries, grapes, apricots, berries, nectarines, and more—all premium grade, too!



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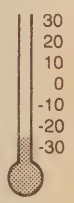

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MOTHER'S CALENDAR

Space in Mother's Calendar is filled on a first come, first served basis. If you wish to list an event in our next issue, the announcement should be sent to this column as soon as the information is available . . . and definitely no later than January 6 (which is the deadline for MOTHER NO. 86). Please remember to include the date(s) and place(s) of the event, and a name and address or telephone number that readers may contact for further information. Mail correspondence to MOTHER'S CALENDAR, 105 Stoney Mountain Road, Hendersonville, North Carolina 28791.

January, 1984; San Diego, California: WHALE-WATCHING EXCURSIONS. Weekends only, two-hour trips conducted by the San Diego Natural History Museum to witness the annual migration of California gray whales. Cost: $7.00 adults, $5.00 children 12 and under, plus $1.00 handling per order up to five tickets, $2.00 for six to ten tickets, $5.00 for 11 or more. Advance reservations by mail required. Contact: San Diego Natural History Museum, P.O. Box 1390, San Diego, Calif. 92112, 619/232-3821.

January, 1984; San Francisco, California: HOLISTIC HEALTH COURSES. Oriental first aid, holistic nursing, meditation, the art of seeing, organic gardening in the city, holistic health assessment. Contact: Healing Center of San Francisco, 465 Brussels, San Francisco, Calif. 94134, 415/468-4680.

January 19–22, 1984; San Francisco, California: TECHNICAL WORKSHOPS ON REHABILITATING HISTORIC BUILDINGS. Enrollment deadline, January 9. Contact: Center for Preservation Training, National Trust for Historic Preservation, 1785 Massachusetts Ave. N.W., Washington, D.C. 20036, 202/673-4092.

January 27–29, 1984; Ashland, Oregon: BEGINNING MIDWIFERY SKILLS INTENSIVE WORKSHOP. Contact: Informed Homebirth, P.O. Box 788, Boulder, Colo. 80306.

January 27–29, 1984; Saranac Lake, New York: SIXTH ANNUAL ALPO INTERNATIONAL SLED DOG CHAMPIONSHIPS. $30,000 cash purse. Contact: Sue Dyer or Kathleen Ivimey, Saranac Lake Area Chamber of Commerce, Saranac Lake, N.Y. 12983, 518/391-1990.

January 30–February 3, 1984; Lake Buena Vista, Florida: EIGHTH ANNUAL CONFERENCE ON ENERGY FROM BIOMASS AND WASTES. Contact: Institute of Gas Technology, 3424 S. State St., Chicago, Ill. 60616, 312/567-3650.

February–March, 1984; Indiana, Ohio, Kentucky, Tennessee, North Carolina, Virginia, Maryland, Pennsylvania, Massachusetts, Maine, Michigan, New York, and Kansas: THE LOW-COST UNDERGROUND HOUSE WORKSHOP. Intensive one-day sessions by Mike Oehler, author of *The $50 & Up Underground House Book*. Contact: Hobbit Housing Co., Rt. 1, Box 618, Bonners Ferry, Idaho 83805, 208/267-7349.

If you want to teach your children at home, you'll first have to get them out of public school.

SO YOU WANT TO HOME-SCHOOL

John Holt

More and more parents have decided, for many reasons, that they would rather educate their children at home than send them to established schools. They're then faced with a tough question: "What do I have to do to *be able* to teach my children at home?"

Since I've helped a lot of people work out successful answers to that question, I will briefly share what I've learned with you.

[1] Find out what your state laws say about school attendance, the legal alternatives to it, the possibilities of home instruction or tutoring, and the requirements for setting up a private school. There are several ways to get this information, all of them good.

One method is to look up the laws yourself. It's easier than you think. Most good-sized public libraries, or law libraries, or lawyers will have a set of all the laws of your state. Look under "Education" in the index of one such collection . . . most or all of what you want will be in this section. Read carefully and copy, if possible, everything dealing with attendance, home schooling, private schools, etc. Also, read and copy everything in your state constitution concerning education and the rights of parents and families.

Looking up the law yourself is a good exercise. It will help cure you of thinking that the law is a mystery known only to lawyers. Also, since you'll know the regulations yourself, you can speak to school officials with the authority of an expert and can correct them if (as often happens) their incorrect or incomplete version of the law fails to mention some of your important rights.

Don't try to find out what the law is by asking your local schools. They may know the statutes on school attendance, but neither they nor their lawyers are likely to know what the courts have said about the rights of parents to teach their own children.

In addition, write your elected representatives, both state and federal, saying that you want to teach your children at home, and ask them to send you all the pertinent laws. It will be useful to have them know that you are interested in home schooling. Even if the representatives do no more than pass your request on to state education officials, *those* people will be very impressed that federal and state legislators are taking an interest in your case, and they'll probably answer your request for information more quickly and fully than if you wrote them directly.

If at all possible, see your state legislators in person, preferably with your children. The representatives will be reassured to find that home schoolers are real, sensible, and serious people (not the careless incompetents that educators have led them to expect), and they may be willing to exert a little influence or pressure on school officials on your behalf, or even to help introduce and pass legislation more favorable to home schooling.

For the same reason, it may be helpful to talk personally to high-ranking officials at your state department of education, especially if you think your local school district may be uncooperative. Because they control state aid, state officials have a good deal of influence over local schools. Local administrators would be much less likely to take a family to court if they knew that such a suit did not have state support.

[2] Read my bimonthly home-schooling journal, *Growing Without Schooling*. Borrow it if you can—though you may not find it in many public libraries—or subscribe (see the access information at end of this article). In the journal you will find much more information about the law, court rulings, legal strategies, and effective ways of approaching and dealing with school authorities than I could ever squeeze into a letter, this article, or even a book. And the more you know about these things, the better off you'll be.

In *GWS* you will find letters from a number of people—much like yourself—who have found safe and legal ways to teach their own children. If they could do it, you can, and you will learn a lot from hearing them tell *how* they did it.

You may also wonder, particularly if you did not do well or go far in school yourself, whether you *know* enough to help your children with their learning. Again, in my journal you will hear from people without much schooling who are doing a wonderful job of helping their children, mostly because they have been able to discover from the children themselves what the schools have never been able to realize: It is the interest, ingenuity, and activity of the *learner*, not the teacher, that is primarily responsible for creating learning.

You will also read much information about sources of interesting and useful books and other materials, as well as school textbooks and packaged curricula (if that's what you feel you must have). *GWS* includes, as well, the names and addresses of lawyers, professors of education, certified teachers, and public and private schools who have helped and are willing to help home schoolers . . . along with reviews of the many books and materials that we keep adding to our own mail-order book list. Finally, you will have the *GWS* directory: a list by states of people (often with the names and ages of their children) who are involved or at least interested in home schooling and are willing to give some advice and support to others who ask.

[3] Get in touch with other home schoolers in your town, region, and state. If there is a local publication in this field (we list these in *GWS*), subscribe to it. These local groups will have up-to-date information about your area's legal and political situation, friendly and unfriendly school districts, successful ways to home-school, good local resources, and so on. Here you will find moral support, friends, and friends for your children.

[4] Decide *how* you want to home-school. There are four ways: by working out an agreement with the local public shools, by registering your own home as a private school, by making your home a "satellite" of an already existing private school, and finally, by just not telling anyone about your youngsters.

Gaining the cooperation and support of the local schools (which is not always possible) without having to lock yourself into the school's rigid curriculum and its endless, useless, and harmful tests (again, not always possible) seems to me to be the best of these methods. In more and more school districts, home-schooling parents now register their children with the local schools, tell them from time to time what work their children are doing, and give the schools whatever attendance records they need to continue to collect their per-pupil state aid. In return, some schools make available to the children whatever resources they may want to use: library, labs, field trips, special classes, athletic teams, performing groups, and so on. The great advantage of such an arrangement is that you don't have to worry that you may be taken to court or told that some

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new "clarifying" state law or regulation or other court decision has wiped out your right to teach your own children. If the local school district is happy with your home-schooling program, you don't have to worry about anyone else being unhappy. Also, your children may then have access to all those public resources, many of which you could never match at home and all of which your taxes help support.

"If you begin your efforts by furiously attacking the public schools, you are sure to have trouble."

The second method, registering your own home as a private school—which can be done in some, but not all, states—is probably used by more home schoolers than any other. Its great advantage is that it keeps the public schools from meddling with your curriculum, methods, tests, and so forth. It has one serious drawback, though: The public schools find the idea of totally unregulated and *inexpensive* (thus available to everyone) private schools so threatening that they fight it with all their strength, trying to get legislatures and courts to say that families in their own homes cannot *be* schools. No matter how many times the public schools lose this battle, they keep on lobbying the legislatures and taking families to court, because they feel their schools' survival depends on it. For this reason, the private-school way of home schooling (though it works well when it works) seems to me unreliable in the long run.

The third method consists of registering your children with an already existing—though possibly distant—private school and having this institution regulate all of your teaching activities. Making your home a "satellite campus" of another school works well when a local school district is willing to tolerate your home school only if it can be satisfied that the *letter* of the law is being obeyed.

But if the local school district strongly opposes home schooling, they may still take you to court on this issue. So far, home schoolers have won many of these cases. For example, recently in Los Angeles county (which is very hostile to home schooling), a judge told a family that, though they could not be a private school, they could be a satellite of an existing school, provided that school was close enough to be able to exercise some supervision in person . . . his idea being that a nearby school with a big financial stake in its own reputation could be better trusted to supervise the family than the family itself.

Finally, there is the underground route. Where the local schools are known to be hostile to *all* forms of home schooling, it may make sense to say nothing to anyone about your children. But then you may really have to *hide* your children . . . not just from the schools, but from almost everyone. This is hard to do in most places (it's perhaps easiest to accomplish in a big city). At any moment, someone—even a relative (many home schoolers have been turned in by disapproving grandparents)—may report you to the schools, in which case you may soon find yourselves in court, with a judge who's now prejudiced against you. Such riskiness seems to me to make this only a method of last resort.

[5] Make a written educational plan. You *must* do this if you want to reach an agreement with the local public schools, and it is a good idea in any case. If the state threatens you with legal action, such a written plan will strengthen your position. Your plan must be complete . . . and therefore, it will be lengthy. In it you should say, in general and in philosophical terms, why you want to teach your own children and then, more specifically, how you intend to direct, observe, and judge the growth and learning of your children. Here you can quote freely (the more the better) from writings on education. You may want to contrast your own educational philosophy with that of the public schools. If so, try to state it as a difference between two sets of ideas and not as a difference between *right* (yours) and *wrong* (theirs). And definitely avoid red-flag words like *cesspool*. If you begin your home-schooling efforts by furiously attacking the public schools, you are sure to have trouble. Instead, it may be helpful to say—as some parents have—that what you plan to do in your home is largely what the schools themselves would do if, rather than having thirty students for every teacher, they had two or three.

Also, quote (as much as you can) not only the laws on home schooling but also what federal and state courts have said about their meaning. (Here again, *GWS* will offer much useful information.) It is important to let the schools know, first, that they *have* the legal right, if they wish, to approve your

WHAT IT CAN BE LIKE

"Just what do home schoolers do? What are their lives like?"

If you're thinking such questions, you may find that Nancy Wallace's new book,* Better Than School, *is just the resource you're looking for. Nancy offers a detailed account of her and her husband Bob's experiences teaching their two children Ishmael and Vita (who, incidentally, were featured on the cover of MOTHER NO. 68). Her book portrays everything from how the Wallaces won the right to home-school from a resistant local school board to the way they tackled math. It's a very personal, inspiring story . . . with a significance that reaches far beyond their four-person family.

***Below, we're sharing a few short excerpts—reprinted with permission from Larson Publications—from* Better Than School.**

It is 8:15 in the morning and I am in the kitchen doing morning chores. I hear the sound of the school bus as it grinds up the hill. It stops, and creaking doors summon the four or five children waiting at the Four Corners. The doors close, again with a creak, and the bus roars off along its morning route. As always, I breathe a sigh of relief as the roar grows fainter. My two children aren't on that bus, and they won't ever have to be.

Although of school age, they are still eating breakfast. Vita, who is five, is smearing peanut butter on her bagel, and Ishmael, who is nine, is making rivers in his yogurt with his spoon. They can usually linger over their breakfasts, because they don't go to school. They learn at home and in the wide world around them. They spend their days reading about things that matter to them, making scenery for their plays and operettas, playing the piano, going to various classes in the community, and, of course, doing what we still call "school work"— math, science, and other academic subjects.

* * * * *

Bob and I were as helpless as anyone when we first sent Ishmael to school, and much of this book, while on the surface about our home-schooling experiences, is really about how we have increasingly learned to trust our own instincts and "know how" in order to raise Vita and Ishmael in ways that make sense to us, even in the face of disapproval, interference, and distrust. I hope that our successes will encourage other parents to develop the self-confidence they need to find ways to share more of their lives with their children, despite the obvious obstacles—whether it is by taking their kids out of school, by bringing their little ones with them to work, by cutting expenses and finding ways to earn money at home so as not to have both parents working elsewhere full-time, and, in general, by not underestimating the importance of the time that they actually spend with their kids.

* * * * *

I mailed the curriculum to the superintendent's office at the beginning of September, and we opened our "school" a few days later. With art and drama classes on Mondays, piano and French on Wednesdays, and nature lessons on Thursdays, we soon settled into a fast-paced schedule. When people I met for the first time asked how I ever managed to teach Vita and Ishmael, I laughed and said, "Oh, I'm not the teacher, just the chauffeur."

In reality, of course, I was doing far more than driving. . . . But despite the fact that I was now much more than a full-time mother to Ishmael and Vita, I discovered that I had more time to myself than I had ever had before. I hadn't realized how much time I had spent

home schooling . . . and then, that there is a legal way of doing this that will *not* cost them their state aid. Even if the schools eventually reject your offer of cooperation, having made it will put you in a much stronger position if they should later try to prosecute you.

By the way, one of the resources we offer here at *GWS* is a collection of parents' letters and educational plans that have won the support of local schools (and as people send us more such letters, we will print them).

[6] If you have decided to try to home-school with the cooperation and support of your local schools, take your written plan and any other pertinent information you may have gathered, and talk to your local superintendent of schools. Appearances count here, so look as conventional as you can (even a little prosperous, if possible). If you are a two-parent family, it will probably be better if both of you are there.

Say in a friendly, courteous, and confident tone that, like many other people in your state and around the country, you plan—*plan*, not *want* or *hope*—to teach your own children at home, and that you would like to work out with the superintendent a way of doing this that will not cost the schools any state aid and that will make it possible for your children to use, if they wish, the resources of the schools. If any people in your state have worked out such an agreement, be sure to mention them. Otherwise, point out that such agreements have been worked out—and are in force—in a number of other states.

In short, try not to appear to be asking the superintendent for permission to teach your children at home. Sound as if it's clear that you *are* going to do it and that all that needs to be settled is *how*. And say several times that you are eager to do this—as many families already are—in a way that does not cost the school money or augment its problems. Add that you have prepared a written educational plan (holding up an official-looking and, I hope, thick folder), in case the superintendent would like to read it.

The odds are very great that if you begin the conversation like this, the superintendent will respond in a friendly and helpful way. If she or he seems uncertain about the law, then—still in a friendly way—say that the courts have repeatedly upheld the right of parents to teach their own children and that you have included more information about this in your written plan. If—as occasionally but rarely happens—the superintendent begins to talk in a strongly hostile or threatening way, say as soon as possible that you are surprised and sorry to meet this response, and that you think it may be better for all parties to continue the discussion in writing, so that at all times there may be a clear record of what has been said. Then leave, and as soon as possible thereafter, send a letter to all members of the school board, explaining what you are trying to do and enclosing a copy of your educational plan. The chances are good that they will say to the superintendent, "Since these parents are so willing to cooperate with us, why can't we cooperate with them?" If this doesn't happen, and things continue to look difficult, get in touch with us at *GWS*, and we can discuss what to do next.

THE BEGINNING

So, in a nutshell, that is how to lay the groundwork for home schooling. My guess is that right now somewhere between 10,000 and 20,000 families in America have chosen to teach their own children. Probably well over 90% of them are doing so without any trouble from the schools or the law. In fact, though these folks may still be a minority, more and more people are teaching at home with the active *support* of the schools.

Good luck to you, and let us know what happens.

"Probably well over 90% of home-schooling families are doing so without any trouble from the schools or the law."

EDITOR'S NOTE: A one-year, six-issue subscription to Holt's Growing Without Schooling *costs $15.00 and is available from Growing Without Schooling, Dept. TMEN, 729 Boylston Street, Boston, Massachusetts 02116. (A sample copy costs $2.50.) Subscribers to the journal can order back issues—there are more than 30 of them—for 75¢ per issue plus $2.00 shipping and handling per order.*

In addition, John offered an in-depth discussion of the reasons for home-schooling in the Plowboy Interview in MOTHER NO. 64 . . . available for $3.00 plus $1.00 shipping and handling from The Mother Earth News®, 105 Stoney Mountain Road, Hendersonville, North Carolina 28791.

dragging around worrying about Ishmael when he had been in school. My whole life had been consumed with his problems, and I had been drained—emotionally and physically—by watching him suffer. . . . By comparison, my life now was a breeze. . . . By afternoon, I found that I was able to sit down for an hour or so and read, or even do some writing.

* * * * *

So the months passed. In the mornings we worked on math for fifteen or twenty minutes, did some handwriting (which included more reading of poetry than writing it), wrote letters and journal entries, drew, and played piano. In the afternoons the kids went to their various classes in town, played with each other and with friends, read, and often did science experiments or read French with Bob. After supper, we played chess or scrabble—and Bob always read to the kids before they went to bed.

This is not to say that we were always quite so orderly. Often we took the day off to visit friends, to go shopping, to take a walk, or just to have a break. We weren't always as productive as I would have liked, and sometimes we went through some really miserable times together. I remember one particularly bad morning when, even before I'd washed the dishes, I began yelling at Ishmael because he couldn't figure out how many twos there were in nine. I managed to set his tears flowing—and mine too, when I sat down to comfort him. About half an hour later, Vita sat down to play the piano, and she just couldn't seem to play anything right. After my experience with Ishmael, I was prepared to be as patient as I had to be, but she wasn't, and she burst into tears. . . . I couldn't help wondering what I was doing with my life. How simple it would be, I thought fleetingly, to send Vita and Ishmael back to school.

Then too, despite the fact that Ishmael did better than ever on his standardized test that spring, I often worried that I wasn't teaching him enough. After all, the rest of the neighborhood kids spent the whole day in school, whereas I only taught Ishmael for an hour or two a day. Actually, the longer he was out of school, the more I began to notice that—regardless of how much time I actually spent teaching him—the pattern of his learning was uneven. It took the form of cycles of intense activity followed by rest. . . . he tended to focus on only one or two primary interests at a time, like playing the piano and reading biographies or putting on plays and writing poetry. And, as though to recuperate from his creative outbursts, he would then spend weeks doing what I considered to be nothing—riding his bike up and down the same stretch of road, making title pages for books which he never wrote, and reading the same books over and over again. It always took an act of faith on my part to believe that he'd snap out of his doldrums. I used to wonder if I really shouldn't make him buckle down and work harder. Once, for example, I was so worried about Ishmael that I went back to his old school and spent the day as an observer in the fourth/fifth-grade classroom, just to get a sense of how much the other kids really learned each day. It was reassuring to be reminded that between roll call, snack time, lunch time, recess, and the natural confusion that takes place when you squash thirty-two kids into a classroom built for twenty-five, not a lot of formal learning takes place. The most striking thing to me, though, was the fact that even though many of the kids read quite well, they still had to read vocabulary-controlled readers and study phonics in class. Certainly it was better for Ishmael to read Ernest Thompson Seton's Two Little Savages *. . . than for him to spend year after year reading colorless textbooks. And I far preferred to see him riding his bike up and down in the sun than sitting in a cramped classroom all day.*

EDITOR'S NOTE: Better Than School *is available for $14.95 postpaid from Larson Publications, Dept. TMEN, 4936 Route 414, Burdett, New York 14818.*

MEDICAL SELF-CARE

NEW HOPE FOR INFERTILE COUPLES

This issue's column was guest-written—for Dr. Tom Ferguson—by a contributor to Medical Self-Care *magazine.*

Melissa Culverwell

An estimated three and a half million married couples in the United States—one-sixth of all married couples in this country—are currently infertile. The figure represents an increase of almost 50% during the past 20 years.

However, thanks in large part to recent medical advances, the situation is anything but hopeless for the millions of Americans now being treated for infertility. The success rate for solving the problem has risen from 50% in the 1960's to about 70% today. And when having children is simply impossible for a couple, there are support groups that can help them deal with the emotional complexities that accompany the situation.

In addition, physicians as a group are becoming more enlightened about the subject than they were in the past. Traditionally, infertility was viewed as a woman's malady . . . but doctors now estimate that 40% of all couples' organic fertility problems rest with men. The woman is judged infertile in half the cases, and in 10% the cause is either shared or unknown.

But *why* has infertility become so prevalent in recent years? Several factors account for the increase.

Maternal age. The social changes and economic pressures of the last decade have caused a large number of couples to delay parenthood. This trend may be beneficial as a move toward parenting from a more secure emotional and financial base . . . but for many women it also diminishes their chances of conceiving. Women reach peak fertility in their early 20's. From the mid-30's on, their reproductive potential gradually diminishes.

Infections. Reproductive-system infections in both men and women take a considerable toll on fertility. They can inflame delicate tissue and leave obstructive scarring. A woman's fallopian tubes, for instance, are especially susceptible to such injury. Sexually transmitted diseases (STD's)—particularly untreated gonorrhea in women—are the most damaging of all. This is disturbing, since STD's now strike more than 15 million North Americans—including 3 million teenagers—every year. The widespread incidence of these infections among adolescents suggests that we may see an even further increase in infertility among young couples in the years to come.

One major cause of infertility in women is pelvic inflammatory disease (PID), which is brought on by bacteria that enter the reproductive tract . . . often as a result of untreated gonorrhea or in association with an intrauterine device. PID can be a "silent" infection, wreaking its damage on the fallopian tubes before any symptoms appear.

Environmental and occupational factors. Drugs, radiation, pollutants, and other toxic chemicals can impair fertility. The testicles are particularly sensitive to toxic chemicals, including such infamous compounds as Kepone, DBCP (dibromochloropropane), and dioxin (the well-known contaminant in Agent Orange, the herbicide used widely in Vietnam during the war). These and other spermatotoxic substances are suspected contributors to a dramatic decline in the average sperm counts of American men during the past 50 years. *[EDITOR'S NOTE: For a detailed discussion of the male infertility problem, read the article titled "The Sperm Crisis" on page 176 of MOTHER NO. 83.]*

Stress also can impair reproductive ability. Studies have shown that anxiety can interfere with sperm production *and* with the female reproductive cycle. Ironically, then, the severe stress of dealing with infertility may actually add to the problem.

Contraceptives. Birth control pills were intended to prevent conception only when taken as prescribed, but some women experience "post-pill amenorrhea", an inability to resume a normal ovulatory cycle after quitting the pill. At highest risk are women who had irregular cycles before they started taking oral contraceptives.

Endometriosis. This disease, long associated with infertility in women, involves overgrowth of the uterine lining, the endometrium. When this happens, endometrial cells appear elsewhere in the body . . . for example, on the ovaries or in the fallopian tubes, which may become blocked. Up to 20% of infertile women—most typically, individuals in their 30's and 40's who have *never* had children—have endometriosis. Severe menstrual pain is commonly the major symptom, but one-third of those with the condition experience no significant discomfort. Laparoscopy, a relatively simple surgical procedure that uses a small instrument to examine the abdominal cavity, is necessary to obtain a definitive diagnosis. Treatments include analgesics, sex hormones, and/or surgery, but all have significant failure rates. Frustratingly enough, pregnancy—if it can be achieved—seems to cure the disease.

Varicocele. This common cause of infertility in men involves a structural abnormality of the blood vessels in the scrotum. Blood collects in the affected area and its heat impairs sperm production and morphology (shape). Fortunately, varicoceles can often be corrected surgically: About 50% of those who have the operation are able to father children.

INCREASE YOUR CHANCES

When attempting to conceive, try to have intercourse several times a week. Only 16% of fertile couples who make love less than once a week conceive within six months, but the proportion rises to 80% for couples who have intercourse four or more times a week. And be sure not to miss the periovulatory period: the 36 to 48 hours after ovulation when the egg travels down the fallopian tube, and when the cervical mucus becomes most hospitable to sperm. A physician, family-planning clinic, women's health center, or book on "fertility awareness" can help you identify this most receptive time.

To further increase your chances, do *not* use commercial lubricants during intercourse. Even such products marked "not for contraceptive use" can slow sperm, decreasing the chance for fertilization. And although saliva is still widely recommended as the best and safest natural lubricant, a recent research report reveals that it, too, impairs the movement and activity of sperm. The study's authors suggest using petroleum jelly, glycerin, or egg white instead.

There is no "magic" lovemaking position for conception, but sperm do need time to reach the fallopian tubes, where conception should occur. Since this journey takes 10 to 20 minutes, regardless of the couple's position, the woman *can* increase the likelihood of conception by lying on her back for about 30 minutes after intercourse. And don't douche . . . this disrupts the sperm.

MEDICAL HELP

If you have trouble conceiving, most doctors recommend continuing to try on your own for at least six months. If you're in your 20's, even a year may be a reasonable length of time. Older couples, however, should keep the maternal age factor in mind and not delay seeking help for too long.

Once you've decided to get a physician's assistance, you may want to start with your gynecologist or family doctor. On the other hand, you can go directly to a fertility specialist: a gynecologist or urologist with additional training in reproductive endocrinology. If your family doctor cannot refer you to such a person, send your request and a self-addressed, stamped business-sized envelope to the American Fertility Society, Dept. TMEN, 1608 13th Avenue South, Suite 101, Birmingham, Alabama 35205. In return, they'll mail you a list of specialists in your area.

Among the many diagnostic tests available to infertile couples, semen analysis is basic, as is a pelvic exam for the woman. If two physicians are involved in the fertility workup—a urologist for the man and a gynecologist for the woman—make sure they stay in close touch. And remember, you should feel free to ask whatever questions you may have about infertility and the procedures your doctor recommends: You have the right to get satisfactory answers, and to have a full explanation of any tests—including their costs—and possible side effects. If you don't feel satisfied and confident with your physician, find one with whom you do.

EMOTIONAL SUPPORT

Infertile couples typically experience strong feelings of guilt, sadness, alienation, and anger. According to San Francisco fertility gynecologist Dr. Robert Nachtigall, "Anyone who has worked with infertile couples soon realizes that universal psychological burdens accompany the condition. Infertility is a potential loss of a basic human expression, and the mind deals with that loss in many ways."

Nachtigall says that fertile couples are often unsupportive of infertile couples. And those experiencing difficulty having children usually find it hard to discuss their feelings even with their closest friends.

For this reason, peer support groups have formed in recent years to help people deal with infertility. Perhaps the best-known organization that offers such assistance is Resolve, Inc. (Dept. TMEN, P.O. Box 474, Belmont, Massachusetts 02178). Most of Resolve's members have all but exhausted the possibilities for traditional biological parenthood, so the organization's goal is to help them deal with their pent-up feelings about infertility, and to make them aware of alternatives, such as adopting a child, trying artificial insemination (by spouse or donor), attempting test-tube conception, or simply learning to accept childless living.

Obviously, infertility is traumatic . . . but more couples than ever who seek appropriate medical and emotional aid can now achieve conception that results in birth. And even those who must remain childless can nevertheless find understanding and support that—in time—can help them adjust to the situation.

EDITOR'S NOTE: Medical Self-Care, *Dr. Tom Ferguson's quarterly journal, is available for $15 per year from Medical Self-Care, Dept. TMEN, P.O. Box 717, Inverness, California 94937. A sample issue costs $4.00. Dr. Ferguson's book, also titled* Medical Self-Care, *can be ordered—for $10 postpaid—from the same address.*

FURTHER READING FOR CHILDLESS COUPLES

Your physician may be able to provide you with—or refer you to—helpful literature on infertility and achieving pregnancy. In addition, you might want to read any or all of the following books on the subject.

Infertility, A Guide for the Childless Couple *by Barbara Eck Menning. 178 pages. Available for $4.95 postpaid from Prentice-Hall, Inc., Dept. TMEN, Box 500, Englewood Cliffs, New Jersey 07632.*

They Say You Can't Have A Baby: The Dilemma of Infertility *by Madeline Blais. 223 pages. Available for $12.95 postpaid from W.W. Norton and Company, Inc., Dept. TMEN, 500 Fifth Avenue, New York City, New York 10110.*

What to Do When You Think You Can't Have A Baby *by Karol White. 240 pages. Available for $11.95 postpaid from Doubleday and Company, Inc., Mail Order Division, Dept. TMEN, 501 Franklin Avenue, Garden City, New York 11530.*

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4 5 [6]	10 11 [12]	16 17 18	22 23 ~~24~~	~~28~~ ~~29~~ 30	34 35 36	~~40~~ 41 42	46 47 48	52 53 54
YEAR 10	YEAR 11	YEAR 12	YEAR 13	YEAR 14				
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ECOSCIENCE

THOUGHTS ON THE DESIGN OF A SANE WORLD: PART I

Paul Ehrlich (Bing Professor of Population Studies and Professor of Biological Sciences, Stanford University) and Anne Ehrlich (Senior Research Associate, Department of Biological Sciences, Stanford) are familiar names to ecologists and environmentalists everywhere. But while most folks are aware of the Ehrlichs' popular writing in the areas of ecology and overpopulation (most of us—for instance—have read Paul's book The Population Bomb*), few people have any idea of how deeply the Ehrlichs are involved in ecological research (the type that tends to be published only in technical journals and college texts). That's why we're pleased to present this regular semi-technical column by these well-known authors/ecologists/educators.*

Anne and Paul Ehrlich

"Ecologists," Aldo Leopold once said, "live in a world of wounds that thinks itself whole." That remark, however, no longer holds true. Everywhere there seems to be a ground swell of public opinion reflecting the realization that the world is badly—perhaps *mortally*—wounded. Indeed, it would be fair to say that no sensible human being today could look at the prospects for our civilization, or even our species, without a sense of foreboding.

The first biennial "Conference on the Fate of the Earth" was convened in New York City in 1982 in recognition of the deep and complex interrelationship between the two greatest threats to the persistence of society: war and environmental destruction. These two forces share roots in the cultural traditions, economic behavior, and technological advances of Western civilization. Indeed, both trace back to the Agricultural Revolution, which some extraterrestrial historian may eventually decide was the first and last big mistake of *Homo sapiens*. It was, after all, that revolution that led to cities, kings, empires, science, industry, the population explosion, the emergence of humankind as a global force, and the development of hydrogen bombs. The insanity of the modern world can be traced almost directly to the dissolution of the saner world of hunters and gatherers 10,000 or so years ago.

Agriculture today is obviously a major source of environmental deterioration, and in turn is hurt by it. Soil erosion, salinization, desertification, and air pollution all work to reduce crop yields, increase hunger, and exacerbate the tensions that can lead to wars. And—to look at the other danger addressed by the Conference on the Fate of the Earth—while it's clear that the environmental impacts of "conventional" wars such as the one in Vietnam have been horrendous, the impact of a thermonuclear war would be immeasurably worse.

GROWTH, GREED, AND POWER

A fundamental cause of both current threats to humanity can be seen in the limitless growth-greed-power syndrome that's so basic to society today. Not only do people strive to conquer each other . . . they strive to conquer nature itself. The result is a world in which a wealthy minority attempts to get even richer . . . while the condition of the poor majority barely improves, remains static, or worsens.

It's a world in which our civilization is held hostage by a thermonuclear arsenal capable of destroying it (see "After Nuclear War", MOTHER NO. 84, page 140) . . . an arsenal that's likely to be detonated by what, in historical perspective, can only be viewed as the most trivial of political differences.

Consider, for example, what would have happened if the Romans in the fourth and fifth centuries A.D. had been capable of blowing up the world. At that time, the Roman Empire was a considerably older entity than is either the United States or the Soviet Union today. And by the "better dead than red" standards some people preach nowadays, the Romans would have been completely justified in ending the world if such an action would have prevented a barbarian takeover! Can there be any more insane view than that the political and economic differences between the United States and the Soviet Union are worth canceling posterity for?

Few would disagree that finding a way back to a rational world must now be at the top of the human agenda. But there has been little broad-based discussion of what such a world would look like. Here and in our next two columns, we'll present some thoughts on that world and make suggestions about paths that might lead to it.

FREEDOM, EQUALITY, AND CHANGE

Let's start by laying out some personal assumptions. We believe that, in any foreseeable future, the tensions between individual freedom and necessary restrictions on it will persist. There's clearly a continuum between living in total freedom and having one's behavior totally constrained by society. Neither extreme is found in any society, human or animal . . . and a moment's reflection will show that, by definition, it would be impossible to *have* a "society" in which there were no restrictions on individual behavior. The realistic question is, Where on the continuum between the impossible extremes should—or can—a society lie? It's our assumption that most human beings would like the maximum amount of freedom that is possible within constraints that still provide a secure existence.

Similarly, the tensions between equity and inequity will also continue. Absolute equality—or equality of *opportunity*—for individuals is not found anywhere on the globe. For a genetically variable species such as ours, which lives in a vast array of different habitats, what absolute equality might be cannot be specified even in theory. Nonetheless, we assume that most people would prefer societies in which there's a higher degree of equity—that is, *fairness* in its broadest sense—than is presently found in, say, Soviet or American society.

We also assume that citizens of a sane world would not operate from sets of fixed "answers" for their problems. Continuous change is a feature of the universe: the solar system, the geology of our planet, and all living systems. In a constantly changing world, people naturally have attempted to find or invent absolutes: religious faiths, political creeds, scientific dogmas, and a myriad of other constructs that can, if simplistically interpreted, be used to eliminate any flexibility of thinking. It would be fatuous to assume that such grasping for certainty would ultimately disappear, but it's reasonable to hope that it could play a smaller role in organizing and governing a sane world. More people would accept the omnipresence of uncertainty in life and learn to deal with it, rather than deny it.

Finally, the sane world we are about to describe is not utopian. Not all misery, inequity, and conflict are banished from it. Creating such a society is clearly not possible on a time scale of interest to those living today. Rational people are not always happy . . . neither would everyone be in a sane world. But reasonable people and societies are not self-destructive, either. In the next few decades, therefore, humanity's task is to move toward a world in which the major trends *do not* lead to lives of want, hopelessness, and degradation for the vast majority of *Homo sapiens*.

ZEROING IN

Let's now look at some of the major features of a sane world:

It would be free of war. We purposely say "free of war" and not "free of *nuclear* war". In our view, nations have no choice but to forego military force as a way of resolving international disputes. There are several reasons for this. First of all, it's already clear that, in the not-too-distant future, virtually all nations who want nuclear arms will be equipped with them . . . and most industrial nations will have thermonuclear

arms. Soon enough, *all* wars, to say nothing of revolutions, will have the potential to become nuclear conflicts. Even if there were full nuclear disarmament, the *knowledge* of how to make nuclear weapons could never be expunged . . . and in case of war, nuclear arms could be quickly recreated.

Second, although thermonuclear weapons are by far the most destructive ones currently in the human arsenal, both biological and chemical arms have the potential for becoming very nearly as deadly.

Third, although it has not been widely noted, the destructive power of "conventional" weapons has increased enormously since World War II. This destructive capability alone makes doubtful whether conflicts between nations with well-equipped non-nuclear forces could possibly lead to large enough advantages for either nation to compensate for the damage done. In short, it seems more and more apparent that future wars *of all sorts* will produce no winners . . . only losers.

The suppression of war, therefore, must be the first priority in a sane world, since virtually all wars carry the risk of escalation both in weapons used and areas involved. And it's crystal clear that another full-scale world war would almost surely end civilization, and possibly threaten the survival of humankind itself.

A sane world must have a smaller human population. If war is to be suppressed and our options are to be maximized, the human population must be well *below* the long-term carrying capacity of Earth. Efforts to support today's population, which has reached 4-2/3 billion, are steadily eroding that carrying capacity. Loss of biological resources, erosion of soils, depletion of freshwater supplies, desertification, and so on are all, at least in part, caused by burgeoning numbers of people seeking increased levels of affluence. Earth is already badly overpopulated. With present and foreseeable technologies, a sustainable global population must be substantially smaller than today's: possibly a billion people . . . or even fewer.

Determining the exact number now, however, is not important. There will be ample time to decide what the optimum size should be, because halting population growth and gradually reducing the numbers of *Homo sapiens* (by keeping birthrates slightly below death rates) will take several centuries. Eventually, though, humanity *can* reach a prudent population level. Among other things, society must be designed so that the population size multiplied by the average level of affluence, with *that* in turn multiplied by the per capita environmental effects of the technologies that supply that prosperity, does not result in environmental impacts that lead to a continuous decline in Earth's carrying capacity.

Some of these ideas were initially presented in a speech to the first biennial "Conference on the Fate of the Earth" in New York City in October 1982. Look for Part II of this discussion in MOTHER NO. 86.

The Ehrlichs' work is supported in part by a grant from the Koret Foundation of San Francisco.

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A replica can bring as much pleasure as the real thing . . . especially when you *build it!*

AN OLD-FASHIONED PIE SAFE

PHOTO COURTESY OF THE FAMILY WORKSHOP

In response to the many people who've suggested that we feature more woodworking projects, here's a handsome and functional piece of furniture from America's past. It's offered to MOTHER's readers by Ed and Stevie Baldwin, owners of The Family Workshop and authors of various books and a series of syndicated newspaper columns on the subjects of woodworking and crafts.

Ed Baldwin

The purchase of expensive antique furniture is sometimes difficult to justify, especially considering that many pieces were built to serve a now-defunct purpose. Yet as people continue to find new uses for old designs, their concern over cost is often diminished by their admiration for the quality of traditional workmanship.

Unfortunately, mere appreciation for things handcrafted isn't enough to assure them a place in the home . . . but if you're willing to part with a few dollars for materials and some evening or weekend time, you can fashion your *own* modern-day replicas that can be just as attractive as—and a whole lot less expensive than—the treasures beckoning at you from the antique-shop windows.

The old-timey pie safe I've chosen to describe here was originally used to keep freshly baked pastries and desserts out of harm's way while cooling . . . and I'm sure you can find a variety of *un*conventional uses to put it to besides. At 14" deep, 3' wide, and 52" high, the cabinet (with its two drawers and three shelves) can easily hold a passel of items. Its 3/4" pine framing and 1/4" plywood panels are standard lumberyard fare, and they serve to accent the punched copper face panels and porcelain knobs perfectly without the expense of hardwood.

To build yourself a pie safe as nice as any antique shop's, you'll need about 38 square feet of 3/4" white pine, 18 square feet of 1/4" plywood (I used a high-grade baltic birch), and 6 square feet of 1/32" (or 20-gauge) sheet copper, along with some hardware I'll describe later on.

Start making the side frames by cutting the four 3/4" X 2-1/2" X 51-1/4" stiles and four 3/4" X 2-1/2" X 7-1/2" rails. Then make 1/4" X 3/8" dadoes at the inner edge of each part to accept the joint splines. (The lower rails rest 5 inches above floor level.) Once that's done, cut the two 1/4" X 8" X 41-3/4" plywood side panels and assemble the structures as two complete units by gluing the frame joints while allowing the panels to float in their dado channels.

The back frame and panel assembly is put together in the same fashion (the panel and rails are simply wider than those of the side assemblies), and then the rear edge of each flank can be butted against the inner surface of the back frame and secured with ten No. 6 X 1-1/4" flathead wood screws.

The framework for the front of the cabinet consists of two 3/4" X 2-1/2" X 51-1/4" vertical facers and two 3/4" X 2" X 31" horizontal facers. A 3/4" X 2" X 5" divider separates the two crosspieces, and a decorative lower trim panel—cut from a 3/4" X 3" X 31" board—spans the uprights at a point 5 inches above floor level. As before, all the frame joints are splined and glued.

A set of three 3/4" X 12-1/2" X 34-1/2" shelves provides storage space inside the safe. Once you've dadoed and splined enough odd boards to make each shelf, you can cut the four 3/4" X 1" X 12-1/2" shelf supports and secure them to the inside of the cabinet's side stiles with glue and 3d finishing nails. The supports will need to be 11-1/2 inches apart, with the lower pair set that distance above the underneath edges of the bottom rails. Since the bottom shelf actually forms the cabinet floor, no supports are needed for it . . . the pieces can simply be glued together at the joints and the entire slab positioned flush with the lower edge of each bottom rail, before being fastened in place with No. 6 X 1-1/4" screws countersunk into the rails and extending into the shelf boards. (Plugs can be used to cover the heads.) The middle and top shelves rest on their flank supports and can be secured in the same manner . . . or simply laid in place, if you wish.

At this point, you can fasten the front framework to the pie safe (by butting it to the side stiles and using coutersunk screws and plugs as before). Then go on to assemble and install the four drawer supports. Each one consists of an upper (3/4" X 3/4" X 12-7/8") and a lower (3/4" X 1-1/2" X 12-7/8") guide, which are butted, glued, and tacked together to form an "L" shape. When complete, they can be fitted flush with the lower corners of the drawer openings and secured with countersunk screws or finishing nails inserted through the front facers and the rear stiles.

The drawers themselves are simple boxes that are assembled by using rabbet joints. Two 3/4" X 4-7/8" X 13" side pieces and two 3/4" X 4-7/8" X 13-7/8" front and back sections form each one's walls. A 1/4" X 12" X 13-3/8" plywood slab—fitted into 1/4" X 3/8" dado cuts 3/8 inch up from the lower edges of the walls—serves as the drawer bottom. A 3/4" X 5-3/4" X 15-1/4" face board (with a 3/8" X 3/8" rabbet at its inner edges) is fastened to the front of each assembly with No. 6 X 1-1/4" wood screws inserted from the inside. To save yourself aggravation later on, pre-fit each face board into its respective drawer opening to assure that the rabbet cuts are sufficient to prevent the drawers' fronts from binding.

Each of the pie safe's doors is actually a triple frame-and-panel assembly, with pieces of copper sheet serving as the panels (though for those on a tight budget, sections of hardware cloth can be substituted and will look nearly as nice). Those inserts are embossed with a punched country tulip design (the scaled-down template—which you'll want to re-create at full size on kraft paper—is provided in the accompanying grid diagram) . . . but you can give rein to your creative impulses if you prefer another pattern.

Start by trimming out your six copper sheets to 10-1/2" X 12" dimensions, then use your template as a guide to dimple the metal over a piece of softwood. A blunt center

punch can be used to make the round indentations that form the flowers, and a slightly sharpened 1/2" cold chisel works well to create the straight flues that suggest leaves. A coat of clear varnish over the completed inserts will prevent them from tarnishing.

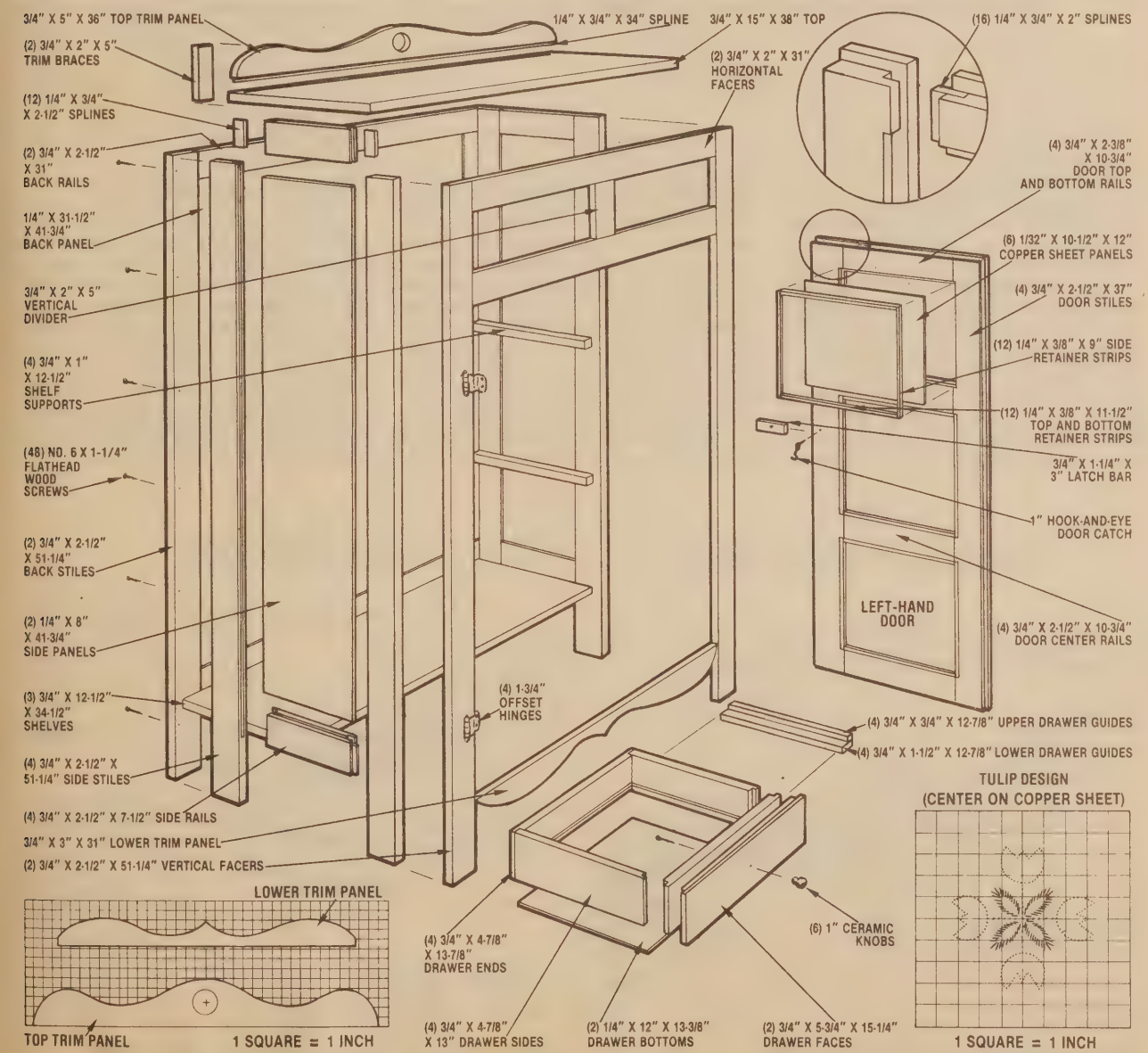
To make the door frames, cut four 3/4" X 2-1/2" X 37" stiles, four 3/4" X 2-3/8" X 10-3/4" top and bottom rails, and four 3/4" X 2-1/2" X 10-3/4" center rails. These pieces should be dadoed at their joints to accept splines . . . but not assembled until you've cut 1/4" X 3/8" rabbets into what will be the inside face of each panel opening. Once that's done, you can glue the frames together, then cut 3/8" X 3/8" rabbets into three sides of each assembled unit so that the doors, when installed, will overlap the cabinet opening at the top, bottom, and outer edges (their union at the center remains uncut and should allow a small gap to prevent binding).

With the frames assembled, go on to install the copper panels by holding them in place inside their rabbeted openings with a total of twelve 1/4" X 3/8" X 11-1/2" top and bottom strips, and an equal number of 1/4" X 3/8" X 9" side strips tacked to the panel openings. Finish up by hanging the doors on the face of the cabinet, using four 1-3/4" semi-concealed offset brass hinges and No. 6 X 3/4" roundhead wood screws, and then installing a small inside brass door catch between the upper shelf and one door. A 3/4" X 1-1/4" X 3" wooden latch bar (dressed with rounded edges) fastened to the face of that door with a No. 6 X 1-1/4" roundhead brass screw can be rotated to keep the other door secured. You can also mount 1" ceramic knobs to the door and drawer faces, as shown in the photo.

To complete the cabinet, install the top and its rear trim piece. Like the shelves, the pie safe's upper surface is constructed of 3/4" boards spline-jointed together, forming a 15" X 38" platform. The trim—cut from a 3/4" X 5" X 36" piece to a contoured shape with a center hole—fastens flush to the rear edge of the top with a vertical spline joint and two 3/4" X 2" X 5" braces attached between it and the back's top rail with No. 6 X 1-1/4" screws. Before mounting the top boards to the cabinet, you may wish to round their outer edges . . . then you can secure the top sections to the walls with countersunk flathead wood screws hidden with plugs. The rear edge of the completed top should be flush with the back of the cabinet, but there'll be a slight overhang at the front and sides.

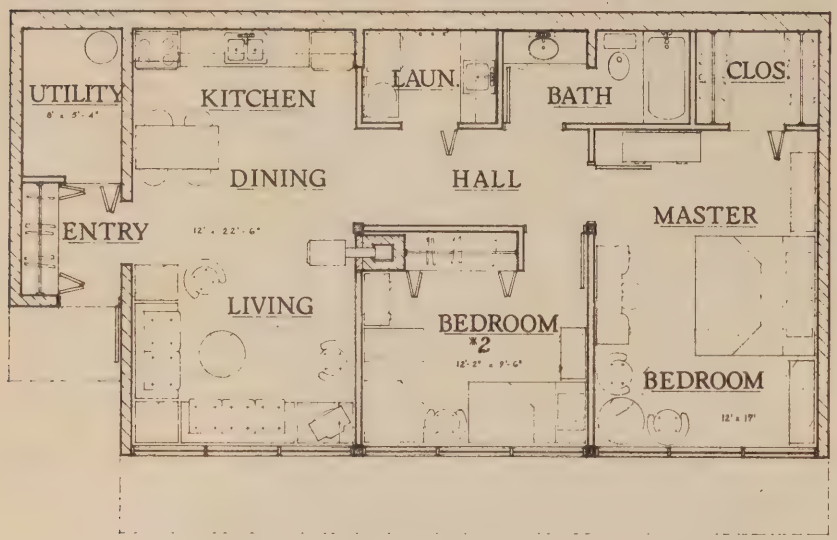
The final finish is, of course, the joiner's choice. After a light sanding, the pine will take several coats of boiled linseed or tung oil nicely. To find a darker hue for your pie safe's finish, experiment with a variety of stains on some scraps of wood. But whether you choose a light or a dark finish, you're sure to enjoy the fruits of your labor for years to come . . . all for a moderate investment and some pleasurable shop hours of woodcrafting.

EDITOR'S NOTE: A more detailed set of pie safe plans—with illustrations and specific instructions—is available for $3.95 from The Family Workshop, Dept. TMEN, P.O. Box 159, Bixby, Oklahoma 74008 (specify Project No. 549-2). Also, a color catalog featuring hundreds of additional woodworking and needlecraft projects can be purchased for $2.95 from the same address.


3/4" X 5" X 36" TOP TRIM PANEL
(2) 3/4" X 2" X 5" TRIM BRACES
(12) 1/4" X 3/4" X 2-1/2" SPLINES
(2) 3/4" X 2-1/2" X 31" BACK RAILS
1/4" X 31-1/2" X 41-3/4" BACK PANEL
3/4" X 2" X 5" VERTICAL DIVIDER
(4) 3/4" X 1" X 12-1/2" SHELF SUPPORTS
(48) NO. 6 X 1-1/4" FLATHEAD WOOD SCREWS
(2) 3/4" X 2-1/2" X 51-1/4" BACK STILES
(2) 1/4" X 8" X 41-3/4" SIDE PANELS
(3) 3/4" X 12-1/2" X 34-1/2" SHELVES
(4) 3/4" X 2-1/2" X 51-1/4" SIDE STILES
(4) 3/4" X 2-1/2" X 7-1/2" SIDE RAILS
3/4" X 3" X 31" LOWER TRIM PANEL
(2) 3/4" X 2-1/2" X 51-1/4" VERTICAL FACERS
1/4" X 3/4" X 34" SPLINE
3/4" X 15" X 38" TOP
(2) 3/4" X 2" X 31" HORIZONTAL FACERS
(16) 1/4" X 3/4" X 2" SPLINES
(4) 3/4" X 2-3/8" X 10-3/4" DOOR TOP AND BOTTOM RAILS
(6) 1/32" X 10-1/2" X 12" COPPER SHEET PANELS
(4) 3/4" X 2-1/2" X 37" DOOR STILES
(12) 1/4" X 3/8" X 9" SIDE RETAINER STRIPS
(12) 1/4" X 3/8" X 11-1/2" TOP AND BOTTOM RETAINER STRIPS
3/4" X 1-1/4" X 3" LATCH BAR
1" HOOK-AND-EYE DOOR CATCH
LEFT-HAND DOOR
(4) 3/4" X 2-1/2" X 10-3/4" DOOR CENTER RAILS
(4) 1-3/4" OFFSET HINGES
(4) 3/4" X 3/4" X 12-7/8" UPPER DRAWER GUIDES
(4) 3/4" X 1-1/2" X 12-7/8" LOWER DRAWER GUIDES
TULIP DESIGN (CENTER ON COPPER SHEET)
LOWER TRIM PANEL
TOP TRIM PANEL
1 SQUARE = 1 INCH
(4) 3/4" X 4-7/8" X 13-7/8" DRAWER ENDS
(6) 1" CERAMIC KNOBS
(4) 3/4" X 4-7/8" X 13" DRAWER SIDES
(2) 1/4" X 12" X 13-3/8" DRAWER BOTTOMS
(2) 3/4" X 5-3/4" X 15-1/4" DRAWER FACES
1 SQUARE = 1 INCH

Follow an architect as he leads us through the planning, pouring, and pounding involved in . . .

BUILDING THE SUN COTTAGE PART V: THE STRUCTURAL FRAME



All too many of us have found that building an energy-efficient home seems to be a dream . . . a fantasy that's kept just out of reach by escalating prices and high interest rates. Of course, MOTHER has long been exploring ways of breaking this vicious circle of waste, and one inventor of solutions—whose work we've shown you before (starting back in issue 67)—is architect Angus W. Macdonald. Angus has developed a number of housing designs that apply low-cost building techniques to passive solar, earth-tempered homes . . . and he's agreed to relate, in a series of articles that will span at least six issues of MOTHER, much of what he's learned about planning and building such structures. The series is following the actual construction of one of the architect's standard designs . . . Sun Cottage.

Angus W. Macdonald, M.Arch.

As we advance toward the final construction stages of your earth-tempered, passive solar home, the choice of building techniques broadens considerably. In the last issue of MOTHER, Part IV of this series discussed the two ways of erecting earth-sheltered walls (from either block or poured concrete), but there are at least *four* good options for the structural frame of your home. A deck of reinforced concrete may be cast to form the roof . . . steel bar joists, with concrete or heavy plywood decking, can be used to make earth-sheltered roofs with long spans . . . heavy-timber roof framing can be set on structural masonry partitions, allowing the use of wooden decking . . . or a heavy-timber, post-and-beam framework of oak may be used in conjunction with tongue-and-groove (T & G) decking to provide an attractive, rustic interior. In this installment, we'll explore some of the practical options for the owner-builder, in hopes of helping you decide which technique best suits your situation.

As you consider the design of your roof, bear in mind that earth sheltering imposes extreme loads on a structure. Not only must the dead weight of water-saturated earth (with a possible surcharge of snow and ice) be considered, but large live loads, such as animal traffic and the weight of plantings, also need to be taken into account. Engineers plan on a total possible load of from 230 to 250 pounds per square foot (PSF) when figuring earth-sheltered roof capacity. And a heavier structure, such as one with a concrete-slab roof, must actually be designed to carry at least 250 PSF because of the weight of the concrete itself.

POUR IT YOURSELF

Spans of cast-in-place concrete roofs are generally limited to a maximum of 12 feet, but aren't as difficult to form properly as you might imagine. I recommend a product called Epicore II (made by Epic Metals Corporation, First and Talbot Avenues, Rankin, Pennsylvania 15104) to help owner-builders form concrete roof slabs. This deeply corrugated, heavy-gauge metal decking acts as both formwork and slab reinforcement for simple spans. The exposed metal ceiling can be painted, and has deep grooves for service laterals. During

FIG. 1
CONCRETE ROOF SLAB

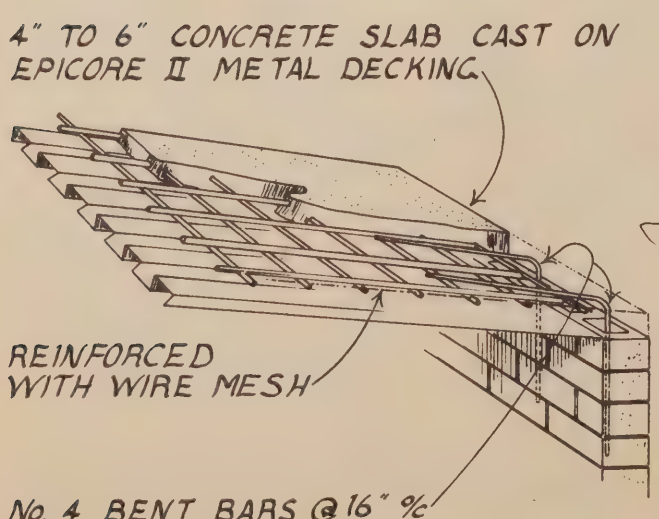
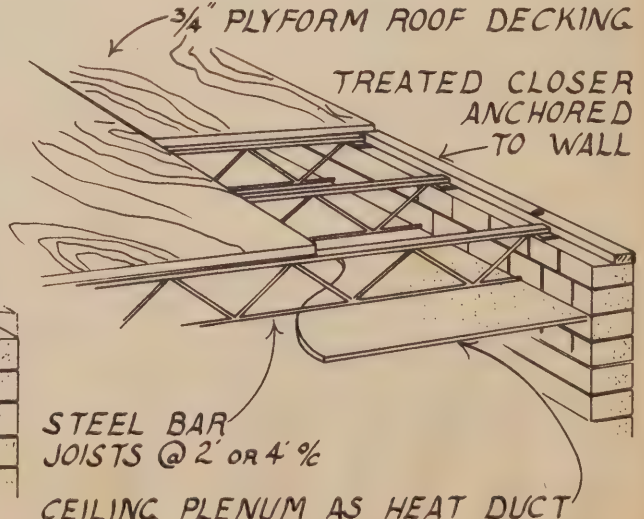


FIG. 2
LONG SPAN ROOF



construction, Epicore II can support workers and wet concrete, provided that *shores* (supports) are placed every 6 feet. And it can generally span 12 feet, using a 4″ slab reinforced only with wire mesh. This is a pre-engineered system that's fully documented by the supplier.

As you may recall from last issue's discussion, the concrete belt beam at the top of block walls can be omitted if you use concrete for your roof, because a roof slab acts as a diaphragm to stabilize the top of the wall. *[EDITOR'S NOTE: Many terms used in this article are defined in the glossary on page 166 that accompanies our article about MOTHER's low-cost earth shelter.]* To link the walls and roof together, bend No. 4 steel bars so that they reach from grouted block cavities into the roof slab (as shown in Fig. 1). As you position wire-mesh reinforcement, you can also place horizontal service runs that you might want to cast into the slab.

GO LONG

If you require a span longer than 12 feet to accommodate an open interior or for flexibility in locating partitions, a commercial system may be utilized to efficiently bridge up to 30 feet with earth loadings. Long-span, steel bar joists can go from the rear wall to the front facade, where they'll rest on a steel beam supported on steel pipe columns. This method requires welded connections but allows large window and door openings along the southern exposure. The steel joists are generally spaced on 2′ centers (see Fig. 2) and must be sized according to span. (For most applications, though, you can expect them to be about 18 inches deep.) A thin concrete slab may be cast on corrugated or 3/4″ plyform decking over these joists. When laying plywood decking, use H-clips and 1/16″ clearance to allow for expansion between boards.

One prefabricated commercial system that I recommend is made by Mid-Atlantic Hambro, of Silver Springs, Maryland. The company provides a fully documented, pre-engineered composite joist system that allows 4′ spacing with lengthy spans. The top chord of each joist projects up into the concrete roof deck, thereby strengthening each joist and reinforcing the slab. Wire mesh is the only additional reinforcement required. This system is easy for owner-builders to install because the hardware insures proper joist spacing. What's more, the 3/8″ plywood used to form the deck can be reused after the concrete roof is set. Services run through the joists, above the ceiling that's attached to their bottom chords.

TIMBER

If you build your Sun Cottage with load-bearing masonry partitions, you can easily employ timber framing for your earth-sheltered roof. For bearing walls that are 10 feet apart, use 4″ X 8″ selected oak beams, on 2′ centers, from wall to wall. For 12′ spans, use 4″ X 10″ beams. The beams rest on 2 X 8 treated top plates anchored to the belt beams by the 3/8″ bolts mentioned in Part IV. Run a *closer* along each plate to form eave overhangs and to help soundproof between rooms (as shown in Fig. 3). All eave framing can be 2 X 8 treated lumber on 2′ centers, since this area won't be covered with earth.

In this case, a 2 X 8 treated plate covers the rear wall or belt beam and is topped by a closer. For roof decking, you can use 3/4″ plyform or treated 2″ T & G boards for appearance. (The wood can be stained or oiled to produce an attractive ceiling.) Horizontal service runs may be laid across the top of the deck, and then holes can be drilled through to place fixtures. Roof insulation will cover the conduit. This bearing-wall design provides great thermal inertia, because of the mass involved in the masonry partitions, but does require more material than post-and-beam framing.

If you elect to use a post-and-beam, heavy-timber structure for your Sun Cottage, the same roof framing practices apply, but the notched beams are set into pockets of 8″ X 12″ crossbeams which, in turn, are supported by 8″ X 8″ posts on 8′ centers. These crossbeams (or main beams) project beyond the front wall to support the eave that protects the south facade. Because oak isn't generally available in lengths greater than 16 feet, splices and diagonal brackets are used to join several members to form each crossbeam. (Since the joists are fashioned with pegs, they create the ornamental and visual interest of a post-and-beam frame.) Plates, decking, and service provisions for the post-and-beam frame are the same as those described for the heavy-timber roof.

A RAISING

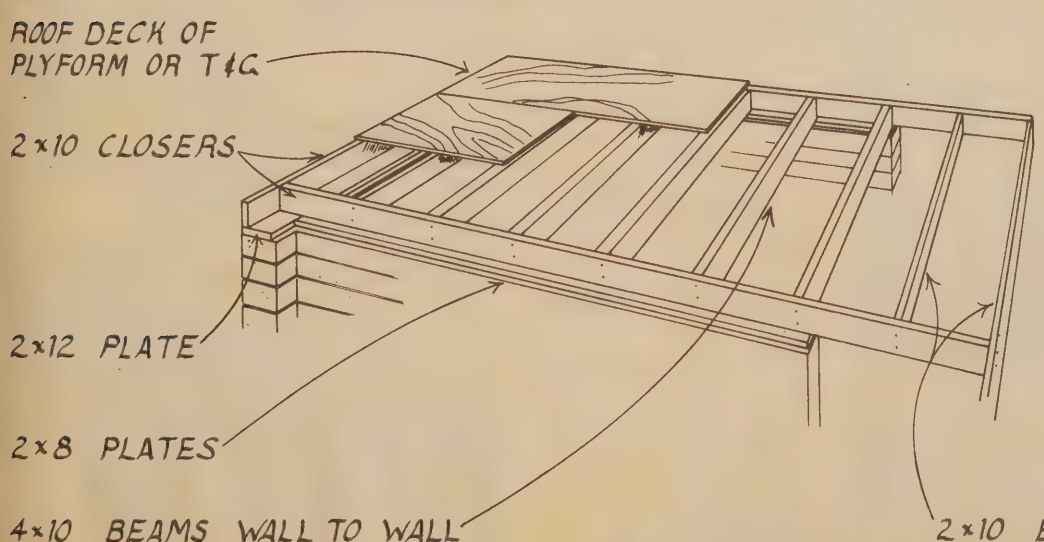
Erecting a post-and-beam frame can be an exciting and pleasant experience. You start by laying out all the pieces for a main-beam and post assembly on the floor to check dimensions for a proper fit. Any modifications should be made before you begin putting up the frame. Next, the post bottoms are drilled for dowels that connect them to the post pads (see Part III), and peg holes are bored to form tight-fitting joints. Assemble each *front-to-rear* post and crossbeam combination separately (see Fig. 4), driving the pegs home with heavy wooden mallets.

Then raise each assembly (which is now called a *bent*), fitting the posts over their dowels and placing the rear beam end onto its rear-wall top plate. This operation is going to take more than one strong back: Oak posts and beams are heavy. A traditional *raising*, as post-and-beam assembly is called, is accompanied by food and drink for all hands. The picnic should be laid out under a nearby tree *after* the frame is completed. With a crew of four to seven, a Sun Cottage single-story raising will make a good morning's work. The roof can be decked off in the afternoon by whoever is still willing to work.

But back to the job at hand: Temporarily brace the first raised bent in a vertical position, but don't *fasten* it to the top plate until the rest of the bents and beams have been positioned. Raise and brace the remaining

(continued on next page)

FIG. 3
HEAVY TIMBER ROOF FOR 12-FOOT SPAN



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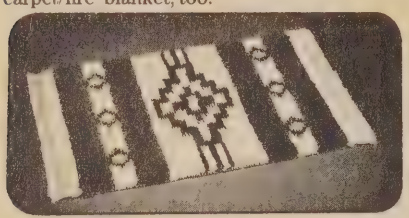

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(continued from preceding page)

bents, and connect them initially with the beams running above the front wall. Once the bents are all linked, the structure can be adjusted with heavy mallets so that the ends of all the remaining 8′ beams can be inserted into their main-beam pockets. Measure the entire roof to insure that it's square and slopes evenly before nailing on the eave framing, closers, and plates. Finally, tighten all of the pegs to firmly secure the joints. George Allman's company, Timber Smith Kits of Gordonsville, Virginia, produces pre-engineered, heavy-timber frames suitable for erection by owner-builders. *[EDITOR'S NOTE: Write to Survival Consultants, at the address given at the end of this article, for additional information.]*

To recap the systems we've described here, let's look back over some of the advantages and disadvantages of each. Concrete roofing systems are strong (they allow spans of up to 12 feet), and they provide thermal inertia through the mass of masonry. But concrete technology is too complex for the average owner-builder to handle unless a pre-engineered forming system is used. (Precast concrete avoids the problems of on-site casting, but we haven't discussed that approach here, as it's often unavailable or—because of transportation costs—prohibitively expensive for rural applications.)

If the building's floor plan requires long open spans, the *only* good alternative for the owner-builder is a pre-engineered steel joist system. Allowances must be made for the thickness of this system, however, since the joists themselves are likely to be 18 inches deep.

Heavy-timber framing is a workable alternative for owner-builders, either as a roofing system on structural partitions or as an entire post-and-beam framework. This approach combines speed of assembly with the softness and warmth of wood for residential interiors, but the thermal inertia of a concrete roof is lost. (Incidentally, throughout this article I've discussed using oak timbers in earth-sheltered roofs. If you decide to build *above*ground, however, standard 2 X 8 pine can be used for superinsulated roof framing, and the decking may be built of 1/2″ plywood.)

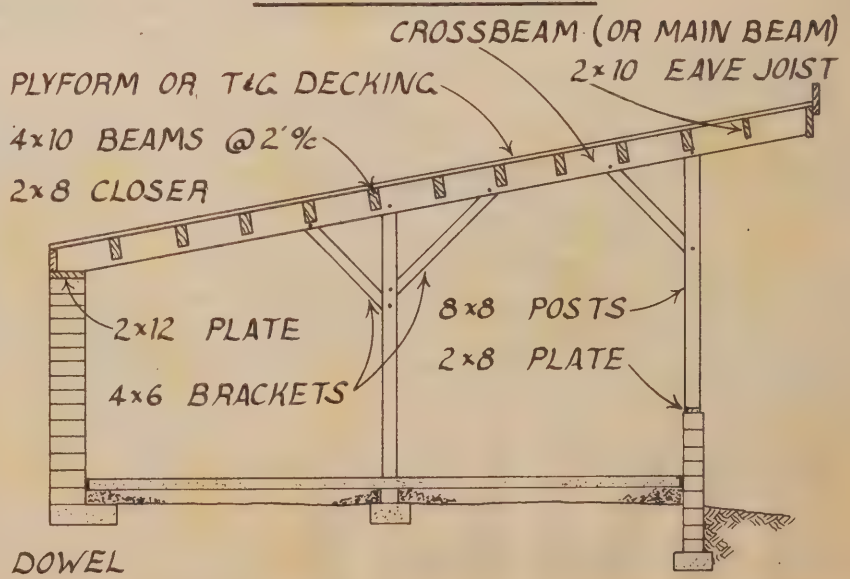
Once again, loadings are critical on earth-sheltered roofs, so carefully follow your plans or the advice of your engineer. Don't take shortcuts in creating the structure of your house. If you heed the advice of experts, you'll have a long-lasting frame for your passive solar home. In Part VI of this series, we'll cover the waterproofing, insulating, and finishing of your energy-efficient Sun Cottage.

EDITOR'S NOTE: For our example in this series of articles, we've chosen the two-bedroom Sun Cottage, an expandable, earth-sheltered, passive solar plan with 1,023 square feet and an estimated building cost of $24,000 (assuming some owner assistance in construction). Angus W. Macdonald has drawn this plan according to HUD's Minimum Property Standards and the Building Officials and Code Administrators' (BOCA) building codes. Complete architectural drawings, specifications, and cost analysis may be purchased from Survival Consultants, Dept. TMEN, P.O. Box 21, Rapidan, Virginia 22733. You can also receive Angus' catalog of 12 low-cost, passive solar, earth-tempered homes by sending $5.00 to Survival Consultants. ❦

HOT OFF THE PRESS

Offset press plates, which are often available for little or nothing from printing shops, are easily worked sheets of high-quality aluminum alloy. Keep one around the barn or workshop, advises Bob Paris of Blanchard, Oklahoma, and it won't be long before you find a place where it'll come in handy. The plates can be used as covers for beehives or birdhouses, gutter flashing, or even roofing patches!

FIG. 4
POST & BEAM FRAME



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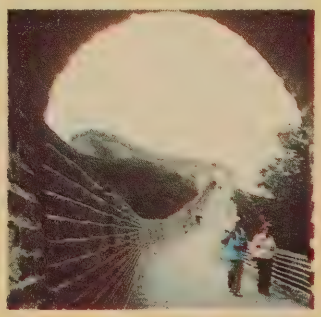

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[1] Take your cuttings from below a healthy bud. [2] Cut the "host" limb off square to form a clean "stump". [3] Split the host stump with a chisel, and wedge it open to make a scion implant. [4] Then coat all cut surfaces with grafting wax to complete the job!

PHOTOS BY THE AUTHOR

GRAFTING THE MIXED-BAG APPLE TREE

By using the easy procedure of cleft-grafting, you can start your very own one-tree orchard!

Ray Meloy

How many folks do you know who can boast of having an apple tree that bears Roxbury Russets, Westfield Seek-No-Furthers, Esopus Spitzenbergs, *and* crab apples . . . simultaneously? Well, *you'll* be able to make that—or your own unique—claim if you follow the made-easy grafting procedures I've outlined here.

You see, I discovered years ago that, even with just one lonely apple tree, I could use a no-sweat technique called *cleft-grafting* to transform something as unpromising as a "crabber" into a veritable apple factory. The time to do your grafting is just before the buds pop open in late winter or in early spring . . . and here's how.

AS EASY AS 1-2-3

The first step is to locate donor trees that offer the varieties of apple you want. I've found that most folks will allow you to take cuttings from even their most valued apple producers, as long as you act as if you know what you're doing . . . and assure them you won't harm their trees. Tree cuttings used for grafting are called *scions*, and you'll want to take them from thin limbs that produced well the previous summer, as evidenced by an abundance of dormant but fat early-spring buds.

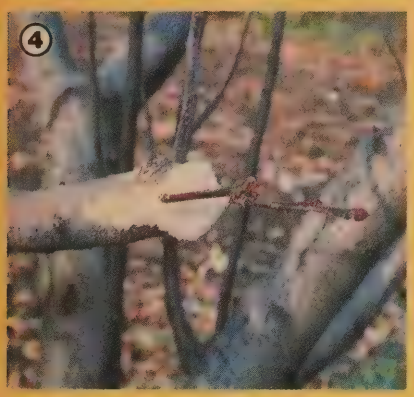
Harvest scions in foot-long lengths, beginning your cut just below one of the buds. With a sharp knife, slice into the limb at a downward angle, so that the cut forms a wedge extending an inch or so below the bottom bud. (It's important *not* to damage the bark on the side of the wedge opposite the bud . . . and don't take so many cuttings that you'll weaken the donor tree.)

When you've collected all the scions that you'll need, just drop the whole batch into a pail of water to carry home and store until you're ready to make the implants.

Step two is to locate your host tree. Often, the best choice is an ailing "fruit factory" that's all but shut down production as a result of neglect. Or do as I did, and graft several delicious varieties onto one of those scrubby little crab apple–makers that seem to grow just about everywhere. In either case, no more than a quarter to a third of any tree should be grafted each year, and only the healthiest branches should be selected as hosts. The limbs can be any length you wish, but their diameters should range from 3/4″ to 2″ at the points where they'll be cut off to receive the scions.

Using a saw that won't tear up the limb, cut the first host branch off square to form a stump. Next, use a chisel or a heavy knife and a hefty block of wood as a mallet to drive a cleft a couple of inches deep (and *no more* than that distance!) into the center of the stump. For now, leave the chisel in place.

Got that pail of scions handy? Using the same bevel cut you employed to harvest



them, shorten each of the longer bud-sticks into 3″ to 4″ sections with three or four buds. Then, with the chisel acting as a wedge to hold open the cleft in the stump, make the implants . . . one scion in a limb of 1″ diameter or less, and two in a larger stump.

Now, here's the *important* part: Do you see that pulpy layer just under the bark? It's called the *cambium*, and it's where all the merging and growing takes place . . . so make sure that the cambium of the scions is lined up and in contact with that of the stump. In addition, the bottom bud of each implanted scion should rest just a fraction of an inch above the stump, facing outward. With two-scion implants, position one at each side of the stump. Next, carefully withdraw the chisel, allowing the cleft to spring shut, clamping the scion(s) in place . . . and you're ready to move along to the next limb.

The final step is to coat all the exposed (that is, *cut*) portions of your grafts with melted wax. And to insure a good "take" for your grafts, give the entire tree a pruning, removing all dead limbs and wild shoots that might rob your "babies" of vital nutrients.

Except to check your wax "wrappers" for damage (recoat any exposed areas), leave the grafts alone for the first year. At the beginning of their second year of growth, prune off the weaker of the two scions on each of the larger host limbs.

AS EASY AS (APPLE) PIE

See? There's no big secret to crossbreeding fruit trees with the cleft-grafting method. And you can do a new batch of grafts each spring until you've converted a near-worthless yard decoration into a multicolored, one-tree apple orchard! ◒

For hot wax on a cold day . . .

BUILD A GRAFTING-WAX HEATER

A generous application of grafting wax is essential for a successful scion implant . . . it's the post-surgery bandage that protects the wound. And though there are lots of commercial grafting waxes on the market, I've had the best luck with plain old paraffin. It's inexpensive, easy to use, and sticks like glue, no matter the weather. But there is *one little hitch to grafting with paraffin: You've got to brush it on while it's melted. Sure, you can melt the stuff on your kitchen stove, but* keeping *it in a liquid state—outside, on a cold February or March day—takes a little doing. It* can *be done, however, and at a cost of absolutely nothing! Read on, and I'll tell you how to build your own grafting-wax heater, using only a few toss-away household items and a pair of pliers.*

You'll need two tin cans of different sizes (I've had good luck with one- and two-pound-sized coffee cans), a straightened coat hanger, and a stubby candle. Cut the lids out of the cans and—if they're a little grungy—rinse them out. Now, gather everything up and move it to a flat working surface. Since the smaller tin will need to rest inside the larger container with enough clearance at the bottom to allow room for the candle, your first chore is to decide how far up from the bottom of the larger can the smaller tin will need to ride. (Hint: It's nice if the top of the inner container protrudes enough to make it easy to grasp with gloved hands.) When you've got it all figured out, mark a ring around the perimeter of the larger can at the correct height.

Now, drill or punch four holes in the outer can at the level of the mark . . . the first two a couple of inches or so apart, and the other pair in the same relative position on the opposite side of the can. Run a section of your coat-hanger wire in one hole and out its opposite mate, then snip off the excess with the pliers and bend the two ends down to lock the wire in place. Repeat this procedure with a second piece of wire so that you have a support "rack" for the smaller tin inside *the larger one.*

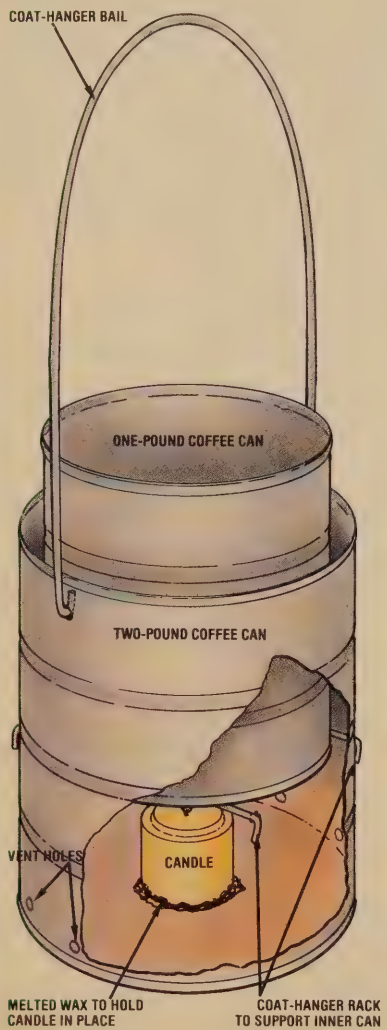
Next, drill or punch two holes opposite each other just below the rim of the outer container. These will serve to anchor a loop of wire for a handle. Bend the ends as you did before, to hold the makeshift grip in place. Then punch a few holes into the lower half of the outer can for ventilation.

To melt the paraffin, drag out an old pan, run an inch or so of water into its bottom, and then place it on the kitchen stove over medium heat. Lower the smaller tin into the hot water and begin slicing thin slivers from your paraffin block, feeding them into the can until you have the quantity of hot wax you'll need for the job. But beware: Melted paraffin will smoke if allowed to get too *hot, so monitor the heat closely.*

Ready your new heater for its outside chores by dropping a little melted wax into the bottom of the larger can, then smunching the candle down onto the molten liquid and holding it there for a few seconds until it's hardened in place. Next, carefully lower in the can of premelted wax (you might want to wear gloves for this), and you'll be all set to bundle up and head for the trees. (On really *cold days, I use a small can of Sterno "canned heat" instead of a candle . . . it puts out a heck of a lot more Btu!)*

Apply your wax bandage with a small paintbrush, making sure to cover all the wounded surfaces of the graft. Try to keep the hot goo off the buds, but don't worry if you slop a little *around where it shouldn't be . . . the growing buds will poke right through when they're ready. If you see that you're going to need more wax than you first thought, just shave in a few more slivers as you go along.*

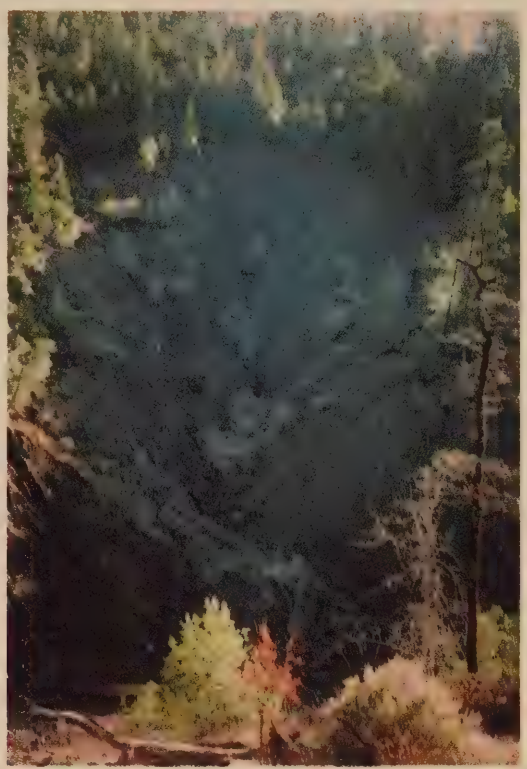
Happy tree-doctoring!



There's a new lumbering technique afoot that combines using and caring for *the woods.*

WHOLISTIC FORESTRY: GROWING TIMBER THE SENSIBLE WAY

RIGHT: Severe erosion can be a by-product of industrial clear-cut tree farming. With environmental damage like that, no wonder many people concerned about forests practically cringe when they hear the word "timbering". But the choice doesn't always have to be between total destruction and no tree harvesting at all. BELOW: Wholistic foresters decide what action to take depending on the needs of an individual site. Here, two men build contour wattles to help stem erosion damage caused by timbering.



PHOTOS SUPPLIED BY GERALD MYERS

Ray Raphael

Would you like to grow timber on your land? Well, there are three basic ways of doing it.

[1] You might want to raise your trees as a commercial farmer raises corn. You plant young trees all in straight rows, all at the same time, and all from the same seed stock. You spray your fledgling forest with herbicides to kill the "weeds" that compete with your "crop" of trees. You spray it again with insecticides should the need arise. You fertilize the soil with chemical compounds to hasten the growth of your stock. And when your trees finally reach a marketable size, you cut them down all at once. A farmer does not harvest every fifth cornstalk and leave the rest; he systematically *clear-cuts* his field. So it is with trees. You clear-cut the forest to make room for your next crop of timber.

These are the techniques used in industrial tree farming. They might or might not appeal to your fancy. Today, though, more and more people who know and love the woods have become understandably suspicious of such a technological manipulation of the forest environment. One of these, timber-owner Fred Behm, a lumberjack who has worked in the woods for 60 years, says:

> I belong to this small tree farm organization, and a year ago we made a tour of the Weyerhaeuser tree farm at Cottage Grove [Oregon]. They took us up on the mountain there, and we could look down across it: It was one of the most beautiful sights I've ever seen—thousands of acres of reproduction. But then I looked at it closely and got to thinking about it. It's one of the most depressing things I've ever seen, too.
>
> Nothing is going to be there. They'll precommercial thin when the trees are 15 or 20 years old, then in 50 years they'll clear-cut. It'll be like a cornfield. There'll be no snags, no old logs in there. Wildlife—squirrels, birds, and salamanders—will have no place. So many creatures live in the snags and under the old logs. What's it gonna be like without them? Like I say, it's beautiful but depressing.
>
> My personal opinion is that nature knows what it's doing, and if you interfere too much with nature, you're going to have problems.

[2] As another option, then, you might try leaving nature alone. Unbridled nature will certainly grow trees. The impressive forests that once covered much of the North American continent gave witness to such bounty. But the ways of nature are slow, even tedious. A cutover tract of land, if left to itself, will go through a gradual progression from brush to mature forest . . . but each separate stage takes time. The entire process of forest succession will often take more than a century to work itself out.

Do you really want to wait that long? Or are there any ways of speeding up this successional process that complement, rather than contradict, the laws of nature? Is there some middle road between overmanagement and no management at all?

[3] Yes, there is. The third strategy for raising timber on your land is *wholistic forestry*. Reacting to the excesses of industrial manipulation, wholistic foresters attempt to manage the woods according to the basic ecological principles of balance and diversity. Instead of simplifying the ecosystem by eliminating unwanted elements, they prefer to utilize all elements to the best advantage of the entire forest. Like industrial tree farmers, they are interested in the production of timber. Unlike industrial tree farmers, they treat the forest as a complex, interdependent system with a life of its own.

But how can you make it work out in practice?

If you're like most would-be foresters, you will probably be starting with land that has already been abused. If you want to grow decent timber wholistically, you will first have to make sure your soil is not going to wash away. Erosion is a most serious enemy, but it can be stopped. You can build check dams in the gullies to slow down the flow of water that undercuts the topsoil. You can build retaining walls of live brush (called *contour wattles*) on the hillsides to keep those slopes from sliding away. And you can also plant a cover crop of quick-rooting, pioneer vegetation to help hold the soil in place.

Wholistic forester Gerald Myers—who descends from several generations of log-

gers—lives in one of the fastest-eroding and most severely damaged watersheds in the country. Yet he is convinced he can grow timber on his land:

Three or four years ago, I started daydreaming about taking this damaged environment and trying to put it back together. That was the first time I started thinking wholistically about this 19-square-mile watershed I live in. I decided to create a labor-intensive environmental repair project that would take the out-of-work rural poor (which we have a lot of) and the damaged woods, and put them together.

One of the interesting things about this wholistic approach is that—when you look at the whole site—you find that a lot of the work fits together. For example, in timber-stand improvement you generate a lot of waste material, and that can be used for erosion control, in contour wattles and check dams. That way, you cure two problems at once.

But most government programs and industrial forestry contracts talk about a contract for just one thing . . . for timber-stand improvement, or for conifer release, or for this or for that. And you get into some of the craziest kinds of situations that way. For example, suppose you are doing a timber-stand improvement project, and a gully runs through the 40-acre tract you are working on. You may be required by contract to *burn* the stuff you cut, instead of using it to stop erosion in the gully.

The concept of wholistic watershed repair, though, is extremely logical. This watershed is a natural, ecological, social, geographical unit. It's a whole piece. When you work on helping *that*, your efforts have favorable effects all the way down.

Another way to help heal your land is to make use of some noncommercial species that occur naturally on your site. Consider, for instance, the red alder, the ubiquitous "weed tree" of the Pacific Northwest. A pioneer species that commonly appears on damaged sites, alder is a quick-rooting tree that penetrates compacted ground, aerates the earth, and stabilizes slumping soils. The roots host nitrogen-fixing nodules that can put more than 200 pounds per acre of atmospheric nitrogen back into the soil each year. The leaves the alder sheds each fall give the soil another 100 pounds of nitrogen per acre per year: three times more than an average coniferous tree would contribute. As an added benefit, alders host certain mycorrhizae that minimize the incidence of root diseases, not only for themselves, but also for neighboring trees of different species.

There are two ways you might want to manage a weed tree such as alder, this natural healer of damaged land. You could allow the alders to prosper unimpeded for about ten years, during which time their nitrogen-fixing capacity is at its greatest. Or, if you don't want to wait that long before planting your commercial timber, you could allow some commingling between your soil-building alders and crop trees. You will probably be pleased with the results, since most commercial species tend to do better in proximity to alders than they would otherwise.

But you will have to watch your land closely, since alders, during their infancy, grow far more quickly than commercial conifers. If you don't hold them in check, the "helpers" might actually *take over* your site. If you were an industrial tree farmer, you would prevent such a calamity by aerially spraying herbicides over your entire tract. Wholistic foresters, however, handle the problem differently: They go through the entire forest on foot, cutting away only those "weeds" that are actually interfering with the trees they are growing for timber. This process is called *manual release*, and it provides on-the-spot attention for each little nook and cranny of the young forest. In the words of Rick Koven, a brush-cutter from Eugene, Oregon:

With manual release we come in and say, "What does each microsite need?" We make a human decision. Let's say I'm in a slide, and there's lots of erosion going on. I look in there and I see all these alders and brush, and they're the only thing holding that slide together. There's also a couple of little suppressed firs. I say, "If I cut those alders, that soil all comes down and there's no fir." So I don't cut them.

In site-specific forestry, instead of releasing *every* crop tree in the unit, you only release the trees that you decide will be most commercially valuable. Therefore you don't use strict spacing, you go for reasonable spacing. You choose the healthiest trees. Don't say, "We have 1,000 acres, and we want 520 trees an acre, and therefore the spacing is ten-by-ten, so we'll release *every* tree ten-by-ten apart. . . ." That's how the big companies work. It's strictly geometrical. Instead, you say, "Is that the most productive way to do it? No! The most productive way is to make the decisions when we get there."

By releasing your timber individually and manually, you eliminate the need for poisonous herbicides; by enriching your soil with "green manure" vegetation, you eliminate the need for chemical fertilizers. You can also lessen the need for pesticides by allowing for a wide variety of living species within your wholistically managed forest. A varied forest has its own natural balancing mechanisms: Disease is less likely to spread in a mixed stand of trees, and insects will be

(continued on next page)

WOODLOT MANAGEMENT (ON A SMALL SCALE)

Alden Stahr (and MOTHER's staff)

A small woodlot has the potential to provide a homestead with firewood, lumber, sawdust, compost, paths for wandering, and nature study opportunities for the whole family. However, keeping your trees in a healthy, productive state demands a good deal of research, planning, and hard work *. . . but then, responsibility comes with owning the territory!*

Bill and Mary Heyne know from experience just how demanding preserving trees can be. A few years ago, gypsy-moth caterpillars invaded the section of northern New Jersey where the couple lives, and the homesteading duo soon realized that they had to take action or risk losing many of the beautiful trees on their 32-acre spread. Being ecologically minded, they protested their township's plan to spray the entire area from the air with the pesticide Sevin and—instead—worked out a program that would dispose of the threat without polluting air or soil.

As Mary wrote to her local newspaper, "Our property doesn't need to be sprayed (with Sevin), because we already have our own program to kill gypsy moths. We collect and destroy moth-egg cases on our winter walks [and] in spring we fund our own selective spraying with Bacillus thuringiensis. *Home gardeners know this nontoxic, nonchemical pesticide as Thuricide (or Dipel), an extremely effective weapon against cabbageworm caterpillars. It works well on gypsies, too! Later, we use hormonal baits in our woods, collecting thousands of dead moths every day."*

But before you can tend your woods, you have to get out in them and see what you've got. And if, after studying your acreage, you discover it's a jumbled mass of diseased—or otherwise injured—trees, or that it's full of nothing but "wolf" (low-quality) growth . . . don't be discouraged. There's still a lot you can do to nurse your property back to productive health just by weeding *(removing crooked, damaged, or sick specimens) . . .* thinning *(cutting out small or undesirable trees to make room for larger, preferred ones to develop normally) . . . and* pruning *(trimming branches to promote new growth or to prevent one tree from inhibiting the progress of another).*

Also, as a precaution against fire (which poses one of the greatest threats to forestland), you can create a boundary track or a through-the-woods fire lane so fire-fighting equipment can enter easily. Moreover, you should remember always to exercise extreme caution when burning any trash near your woods (especially on dry, windy days), and have fire brooms and water tanks ready during dry seasons. Finally, it's a good idea to post your property to discourage trespassing, and to keep constant guard against trail bikes and other breeds of soil-spewing, spark-spitting recreational vehicles that threaten to ruin forest floors and start fires.

Your best approach in dealing with tree-killing insects and diseases is to seek out help and information from your local forestry service. The folks there will be up on knowledge about what pests and fungi affect your area. However, when you contact them, keep in mind (as the Heynes did) that there are plenty of natural ways to get rid of harmful bugs and diseases. (For example, you can eliminate certain species of caterpillars manually by wrapping the trunks of your trees with flypaper or folded-over burlap . . . materials that trap the leaf-nibblers on their nocturnal ascents.)

All in all, being good to your woods may take some time and effort, but it's the least you can do to help insure that a portion of today's forestland will still be around tomorrow for future generations of woods lovers to utilize and enjoy.

(continued from preceding page)

held in closer check because you'll be maintaining a habitat for insect-eating birds.

The different species in your forest will probably mature at different times. This will enable you to avoid clear-cutting. Instead, you can harvest your trees selectively. When it is time to decide which trees to cut and which to leave, don't make your decisions on some arbitrary, preconceived idea of how big the timber should be. Instead, the first trees you cut should be those that are stifling the growth of their neighbors. Your major concern should always be the future development of the forest.

How do you remove the timber you want without injuring the trees that are still left in the ground? That's a tricky business. As Bud McCrary—one of the professional loggers in the California redwoods who specializes in selective cutting—points out:

> You have to have darn good fallers to practice the kind of selective harvesting we do, because you don't want to damage too many of the smaller trees. You don't just send some joker up there and say, "Here's a chain saw. Go up there and fall that mountainside." You've got to have somebody who really knows what he is doing. We also do a lot of cable rigging and jacking to pull the trees the way we want them to go. That all takes more time and more labor.

One of the most sensitive aspects of timber harvesting, according to McCrary, is the road-building:

> More than the cutting, it's excavating that is really damaging our resources in the long run. We use small equipment, careful planning, and narrow blades. We actually try to cut our roads with very, very sharp-bladed equipment. It's like a surgeon using a scalpel. If you make sharp and clear incisions, then you make very light incisions; whereas, if you use a blunt instrument, it takes a lot more power to operate it, to push it through. The equipment doesn't handle as well. You don't build a road just exactly where you want it, so you're moving more soil to get the same results. If you have sharp blades—real dagger corners at the end of the dozer blades—you can put that thing right where you want it. You don't have to dodge off, go above or below a rock: You go through the damn thing. You'd be amazed at the kind of roads we build.

Heavy equipment such as bulldozers and logging tractors is capable of doing severe damage to the land. Bud McCrary handles them well, but they are commonly misused. In some cases, you might be able to utilize animal power rather than machine power. Horses can serve as ideal logging tractors: They pick up their "wheels" and step over the small irregularities in the earth's surface, instead of driving relentlessly over every little obstacle. But if you want to use flesh and blood instead of steel, you have to be working with appropriate timber on appropriate terrain. In the words of horse-logger Joaquin Bamford:

> In horse-logging you have to look at the timber before you go and say, "Yeah, I can log that." The best type is second growth, timber that ranges from 15 years to 40 or 50 years. You want it small, but not too small. We usually won't go into timber that is less than 12 inches on the butt.
>
> And you need to look at the land. You want a downhill pull, if at all possible. You look at your terrain. You find out what the soil is like: whether it's loose soil, whether it's on a steep hillside, whether there will be erosion where you drag the timber down. You have to look at it as a conservation practice.

The ideas behind wholistic forestry might seem foreign to the American tradition of environmental exploitation. Elsewhere, however, wholistic forestry has been practiced successfully for years. Dr. Rudolf Becking, a forestry professor now working in Indonesia, reports that this kind of well-balanced forest management has a long tradition in the Couvet district in Switzerland, where he received his professional training:

> Experience taught the Swiss many centuries ago that when you start to do heavy cutting—clear-cutting—then avalanches will develop, and the whole safety of the valley will be threatened because of these steep mountain slopes. It is of paramount importance to keep trees on the slopes, because that is the people's protection. So a primitive management system developed, where they only cut a few trees here or there. Experienced farmers were elected by their community to designate which trees would be cut this year, and which trees would be cut next year, and so on.
>
> The same farmers always come back. There are no contracts where they come in to make this amount of money and then disappear. A tradition has developed. All the way down to the worker, you have a commitment to a specific piece of land. And specific trees.
>
> The forester not only has to mark the timber, he has to reason out which tree to cut. And he marks which direction it has to go. He has to do it in such a way that his first concern is the replacement, not to lose the growing stock. What can he substitute in its place? He releases some younger trees, which then will grow faster. This is the process—but sometimes he makes mistakes.
>
> Then the faller will immediately spot the mistake. He'll recognize which way the tree will go, and, if that differs from what the forester had in mind, the faller can halt the process. He can say, "I don't want to cut the tree this way."
>
> Certain trees that are too big-crowned are earmarked, and then the faller will have to climb the tree. He will saw off the branches and actually lower the branches by rope, so they don't break some regeneration. Then once the branches are off, he will drop the tree like a pencil into the stand.

The future, it would seem, looks bright for wholistic forestry in our own country. This system of beliefs is based on the principles that everything in the world is connected, and that, in this finite, interconnected space, nothing can be wasted or ignored. The fundamental strategies of wholistic forestry are as simple as a Zen precept: Use manual labor whenever possible . . . avoid artificial substances . . . treat each site as a specific problem in the context of a totally connected world ecosystem . . . find strength in balance and diversity . . . and—the golden rule—complement, rather than contradict, nature's actions as much as possible.

Significantly, wholistic forestry differs from the preservation movement and other voices opposed to industrial tree farming in that it is an *active*, not a passive, approach. Wholistic forestry acknowledges our economic need to use the forest as a resource. And as resource-oriented problems become ever more prominent, a passive approach to the bulk of our productive forestland will no longer be tolerated. Hence, it is the activism of wholistic forestry that is its greatest hope.

So, if you want to grow trees that eventually will be cut down—but you love the woods—then wholistic forestry is just right for you. You too can help produce the timber we need . . . by growing trees the sensible way!

EDITOR'S NOTE: For some wise forestry words from our 1983 choice for the Environmental Hall of Fame, see page 117.

ACCESS MATERIAL

For further information on the vast subject of woodland preservation and wholistic forestry, you may wish to consult the following books:

[1] Tree Talk *by Ray Raphael, the author of this forestry article. This fascinating book—which provides a unique forum where such diverse individuals as industry executives, environmentalists, old-time woodsmen, and young pioneers speak their minds about contemporary forestry practices—is available for $12 plus $1.00 postage and handling from Island Press, Dept. TMEN, Star Route 1, Box 38, Covela, California 94528. California residents should add 72¢ for state sales tax.*

[2] The Country Journal Woodlot Primer: The Right Way to Manage Your Woodlot *by Richard M. Brett (available from The Country Journal Publishing Company, Inc., Dept. W-TMEN, 205 Main Street, Brattleboro, Vermont 05301 for $9.95 plus $1.25 shipping and handling charges) is a recently published book that gives useful information about what you can do to nurture your woodlot to gain the most enjoyment and highest yield from it.*

[3] Woodland Ecology *by Leon Minckler provides practical wisdom on environmentally sound forestry techniques for owners of small woodlots ($11.95 plus $1.25 shipping and handling from Syracuse University Press, Dept. TMEN, 1600 Jamesville Avenue, Syracuse, New York 13210).*

[4] Land in America *by Peter Wolf ($20 plus $1.00 shipping and handling from Random House, Inc., Attention: Order Dept.-TMEN, 400 Hahn Street, Westminster, Maryland 21157) examines the hard-core economics of buying, selling, and taking care of our nation's forestland.*

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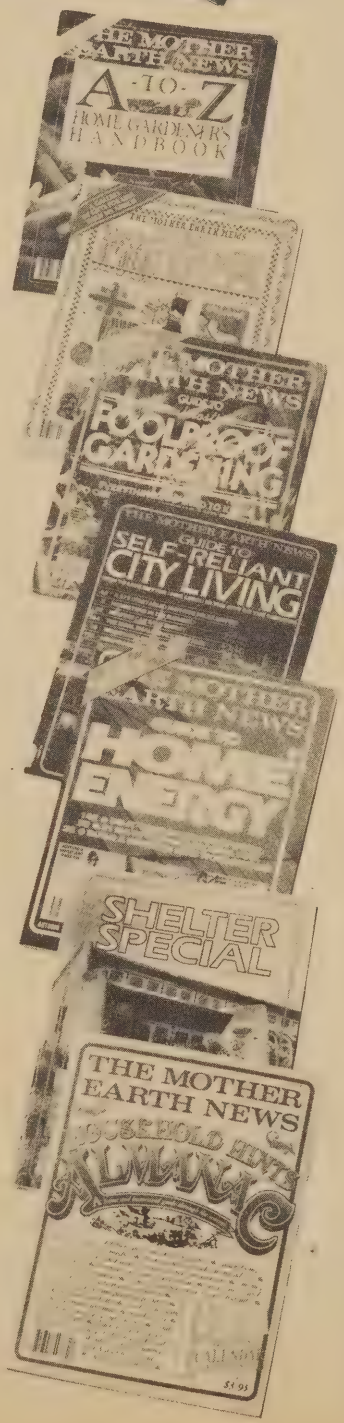

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ACCESS

Money won't buy a place in this column, but suggestions are invited. What do you want to share?

CONSERVING ENERGY IN OLDER HOMES
Analytech
Dept. TMEN, Suite C-30
915 King St.
Alexandria, Va. 22314

Is your fuel bill getting bigger than your pocketbook? Do you live in a well-worn home that's definitely showing its age? If so, it's time you got hold of Jeffrey Seisler's succinct, well-illustrated, and downright handy book, CONSERVING ENERGY IN OLDER HOMES. The 44 large pages of this guide will tell you how to inspect a pre-1940 dwelling for heat losses . . . exactly what to do to fix it up (with clear advice on which steps offer the best return for your investment) . . . and how to save energy in the house's heating system. By the way, this manual was originally commissioned by the Department of Housing and Urban Development as a sequel to its fine conservation guide, IN THE BANK OR UP THE CHIMNEY. When Reagan budget cutbacks forced HUD to drop the book, the principal author stuck his neck out and had it printed himself. And as far as we're concerned, he made a wise move. CONSERVING ENERGY is well worth every penny of its $5.60 (postpaid) sale price!—*PS.*

* * *

THE CHAIN SAW CRAFT BOOK
Pruett Publishing Company
Dept. TMEN
2928 Pearl St.
Boulder, Colo. 80301

Harold "Hal" MacIntosh is known in the environs of Durango, Colorado as "the chain saw man". And for good reason: Hal's sturdy and beautiful log benches grace the city's parks, while his detailed and lifelike wood statues and bas-reliefs adorn many a building in the rustic Rocky Mountain village. MacIntosh does it all—from the most massive log bench to the finest hair on a carved mountain man's beard—with a chain saw.

Hal's talents also extend to writing, photography, and line drawings, and he's combined them all in THE CHAIN SAW CRAFT BOOK, a large-format, 134-page instruction manual for turning your woodcutting tool into a multi-use construction and craft implement. MacIntosh skillfully guides his readers through general use and safety rules, how to select and find the best woods for different projects, the basic cuts necessary for construction and carving, plus 86 pages of projects . . . including chairs, tables, benches, stools, couches, beds, racks, lamps, plaques, shelves, cabinets, toys, bowls, baskets, dippers, and log buildings!

If you've ever admired the woodsy, heavy-duty look and ruggedness of log furniture, and would like to learn to use your chain saw to build, furnish, and decorate your home, here's your chance to discover everything you'll need to know . . . from one of the best we've yet seen. THE CHAIN SAW CRAFT BOOK is available in many bookstores, or by mail from the publisher for the *very* fair price of $7.50 postpaid. It's a no-nonsense manual for learning to do more with less.—*DP.*

* * *

CATALOGS FOR BUILDERS: The Solar Components Corporation, which claims to be the country's largest solar mail-order house, has released its newest SOLAR CATALOG, which displays enough merchandise for almost *any* passive or active solar project. (You can get this shopping guide by sending $1.00 to SCC, Dept. TMEN, P.O. Box 237, Manchester, N.H. 03105.) The 75-page catalog is filled with thorough descriptions of old *and* new solar construction items.

THE WOODWORKERS' STORE 1983/84 CATALOG has just about anything you'll need for your home woodworking projects, including veneering materials, tools, caning supplies, specialty hardware, furniture-finishing products, an assortment of books . . . and a whole lot more. You can even order plans for making a 42"-diameter pedestal extension dining table, baby cradles, beds, desks, and a rocking chair. Best of all, so you can see what you're getting before it arrives on your doorstep, this 112-page directory is loaded with color pictures. The catalog is available for $1.00 from The Woodworkers' Store, Dept. TMEN, 21801 Industrial Blvd., Rogers, Minn. 55374.—*CW.*

* * *

BIRTH ALTERNATIVES AND HEALTH: Marilyn Moran's BIRTH AND THE DIALOGUE OF LOVE is ideal for couples wanting a home birth, especially those choosing an *unattended* delivery to promote the father's active role in the birth process (which Moran maintains has been wrongly usurped by obstetricians). The book reflects views rooted in Catholicism—particularly the purpose of man and woman within the family unit—but no matter what your political or religious beliefs, BIRTH is valuable reading . . . for, while the importance of mother-child bonding has been well documented, Ms. Moran gives a thorough account of the nature of *wife-husband* bonding that can occur during a home birth when only the parents and (of course) baby are present. She also instructs couples on how to prepare for their home birth, including supplies they'll need. The book can be ordered in softcover from The New Nativity Press (Dept. TMEN, P.O. Box 6223, Leawood, Kan. 66206) for $10.95 plus $1.00 shipping and handling.

At the other end of the spectrum, SILENT KNIFE: CESAREAN PREVENTION & VAGINAL BIRTH AFTER CESAREAN comprises 434 pages of facts, personal stories, and advocacy, to enlighten hospital-birth couples about ways to avoid unnecessary first *or* subsequent cesarean deliveries. The authors, Nancy Wainer Cohen and Lois J. Estner, have an important cause: Cesarean operations are being performed in 15% to 30% of hospital births across the country today . . . yet 30 years ago, cesarean-section rates were about 5%! Along with discussing ways to enhance hospital deliveries, Cohen and Estner cover home birth and the beneficial aspects of nutrition, exercise, and emotional support during pregnancy and labor. If you've had a cesarean birth, know someone who has, or simply want to *avoid* having one, don't miss this book! (It can be ordered from Bergin and Garvey Publishers, Dept. TMEN, 670 Amherst Rd., South Hadley, Mass. 01075, for $14.95 plus $1.00 shipping and handling. Massachusetts residents should add 5% sales tax.)

If neither of the titles above sounds like just what you're looking for, check out THE WHOLE BIRTH CATALOG: A SOURCEBOOK FOR CHOICES IN CHILDBIRTH edited by Janet Isaacs Ashford. Under such headings as "Being Pregnant", "Giving Birth", and "Living in Family", WHOLE BIRTH runs commentaries, excerpts, and critiques of *every* imaginable resource available . . . including books, clothing, carriers, toys, organizations, and so on. To get your hands on this comprehensive softbound publication, send $14.95 plus $1.00 shipping and handling to The Crossing Press, Dept. TMEN, P.O. Box 640, Trumansburg, N.Y. 14886. (THE WHOLE BIRTH CATALOG can also be ordered—for the same price and handling charges—from Mother's Bookshelf®, 105 Stoney Mountain Rd., Hendersonville, N.C. 28791.)—*CW.*

Here's the fourth of a series of articles that will help you tell friend from foe in your garden.

THE BACKYARD JUNGLE: PART IV, SPIDERS

CRAB SPIDER

JUMPING SPIDER

WOLF SPIDER

ORB WEAVER

PHOTOS BY THE AUTHOR

Ron West

Few creatures are more misunderstood—or maligned—than spiders. Actually, of the 30,000-plus species of these purported people-poisoners, very few pose any real threat to humans. Rather, most of them are extremely useful to us: Not only do they help preserve the delicate balance of nature, but they're often among the first small predators to become active in eradicating pests from the spring garden plot.

Like other arachnids, a spider differs from an insect in that it has eight rather than six legs and two distinct body sections (as opposed to an insect's three). It may not be much of a danger to you or me, but a spider's a remarkably efficient killer machine when it comes to creatures of its own size. The two fangs mounted below its head are connected internally to venomous glands, enabling it to sedate and paralyze its prey immediately upon capture. Some spiders inject a digestive enzyme (which liquefies body tissues so that they can be easily ingested) directly into a victim's body cavity, while others first crush their quarry and then cover its carcass with the substance. Either way, all that remains after the spider's repast is an outer shell.

However, before dinner can begin, a victim must be caught . . . and many an eight-legged killer prepares by spinning a silken web from a liquid protein produced by a group of internal glands near the tip of its abdomen. As this fluid is pulled through the spinnerets (a cluster of external nozzles located near the anus), it hardens to form the prey-trapping net. The strands of the web may seem flimsy, but their tensile strength can be greater than steel filaments of the same diameter!

This silk is also used by spiders to fashion protective cocoons for their eggs and for wrapping up their prey. Perhaps its most fascinating use involves a behavior known as *ballooning*, a technique whereby arachnids can sail through the air for long distances on threads produced by their own bodies. (Young spiders disperse themselves to different areas this way.) To balloon, a spider stands on a lofty spot with its abdomen raised and squirts several strands of silk out into the atmosphere. These still-attached off-shoots serve as a parachute whereby a silk-spinner can hoist itself onto a passing breeze and journey several hundred feet in one bound.

At least 3,000 species of spiders are found throughout North America. To simplify matters, most of them can be divided into two categories, according to their predatory habits.

Trapping spiders construct webs to capture their diet of mostly mature flying insects. In this division are the common orb-weaving *Araneidae* that spin the familiar flat, spiraling webs on vegetation . . . the cobweb spiders (*Theridiidae*) . . . the funnel weavers (*Agelenidae*) . . . and the sheetweb spiders (*Linyphiidae*). In general, arachnids of these types are considered to be lower on the evolutionary scale than those in the other category: the *hunting spiders*.

Hunters—which go out and seek their food rather than passively waiting for it—are very helpful to gardeners, because they often snare pests that are not yet mature enough to fly. The most numerous hunters on this continent are the crab (*Thomisidae*), jumping (*Salticidae*), and wolf (*Liosidae*) spiders.

Of these three, crab spiders (so named because of their shell-like appearance) are the most common and are usually found with their long front legs spread wide open on flowers or leaves, waiting to ambush unwary victims. Most of the crab spiders are light- or medium-colored, and a few of this type are able to change their hue slightly to blend in with the surrounding foliage.

Jumping spiders have compact bodies and short legs, and are characterized by constant short, jerky movements. They do their "dirty work" by leaping forward quickly to kill their prey. Like most spiders, jumpers have eight eyes, but their abnormally large peepers enable them to detect objects several inches away . . . which is considered excellent eyesight for a spider.

Wolf spiders are more typically spider-like in appearance and frequently—because of their dull coloration—travel about unnoticed in their habitat on the ground and under debris. Like the jumpers, *Liosidae* have big eyes and better than average vision. The female wolf spider is an especially "conscientious" mother, carrying her eggs in a small, spherical sac attached to the tip of her abdomen. When the eggs hatch, the babies climb aboard her back and ride there until they're ready to be on their own.

It's unfortunate that so many of us are taught at an early age to fear these fascinating, usually benign creatures. We're really much better off *with* them than *without* them, as any knowing gardener will tell you.

HUMAN-POWERED SPEED

The bicycle stands as one of the best examples of appropriate technology around today. After all, "A.T." (an applied science that incorporates social and cultural values) is characterized by simplicity, universality, affordability, and reliance upon renewable resources . . . all of which are undeniable attributes of that familiar and extraordinarily efficient two-wheeled machine.

Here at MOTHER, we've developed several pedal-powered machines of our own that put leg (and arm) energy to practical use . . . including an inexpensive recumbent tricycle that combines to good advantage a number of "tried" design features (see Issue 81, page 162).

It should come as no surprise, then, that this magazine's staffers would be interested in what's going on at the frontier of bicycle technology . . . which is annually revealed at the International Human Powered Vehicle Association's Speed Championships. Recently, the Indiana IHPVA chapter sponsored the 1983 event at Indianapolis (appropriately enough) . . . and the racing capital's distinctive facilities, coupled with the enthusiasm of entrants and supporters alike, proved to make this ninth annual competition one of the most successful yet.

Traditionally, the championships have included several events in two categories: single- and multiple-rider vehicles. This year, though, that program was expanded to include 4000-meter velodrome pursuit races, an *arm*-powered-only class, and a practical-vehicle competition. The Indy 500 speedway was host to the unlimited and the 600-meter "flying start" speed trials—both clocked over a distance of 200 meters—while nearby Raceway Park was the site of the 1/4-mile sprints and the 12-1/4- and 21-mile road events. A local city park's hilly and winding 2-1/2-mile paved course provided an ideal setting for the final 5- and 20-mile Le Mans and paced-start road races.

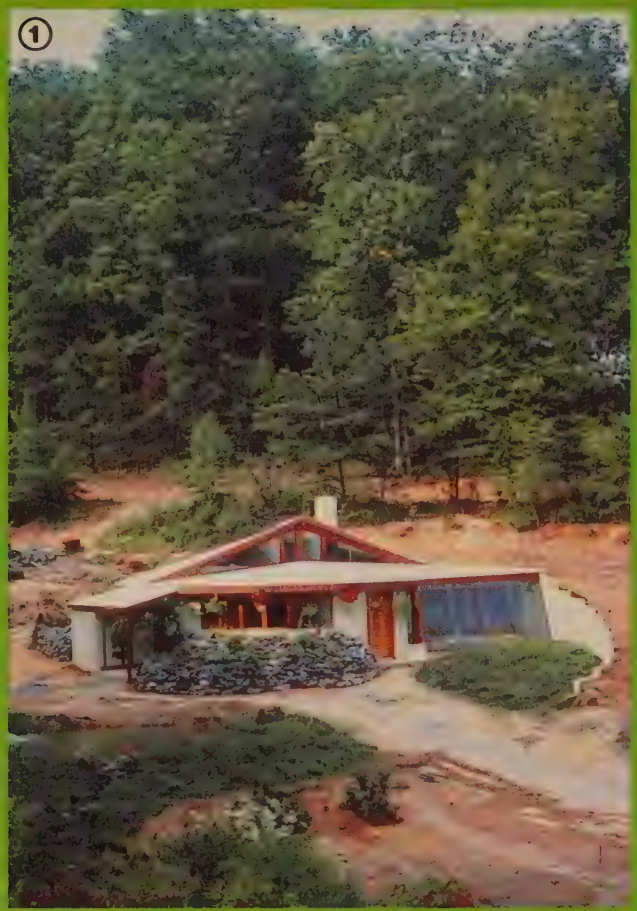
The speeds achieved throughout the competition (about 55 MPH in the sprints and in the 30's over the road courses) were clearly impressive. Still, they tell only *part* of the story. The real import of the event lies in its influence on human-powered technology and that development's effect on society. With the advent of strong, lightweight construction materials, the growing knowledge of low-speed aerodynamics, and continued advances in adapting mechanical techniques to the human body, it's becoming evident that human-powered vehicles need not be associated exclusively with athletic individuals, but may someday be regularly used for commuting and recreation.

Of course, some of the "top of the line" vehicles you see here take advantage of state-of-the-art technology (often provided by supportive manufacturers) and represent considerable investments. On the other hand, a fair number of machines offer an intermediate approach and were designed by people leaning toward affordable, practical vehicles for the developing public market. There are also indications that *next* year's IHPVA event may include an "assisted" class, which will allow the use of stored energy such as that from flywheels, accumulators, and even large rubber bands. We think any endeavors in the human-powered arena are efforts well spent. And whether the end result is a personal get-around-town conveyance or a pedal-powered compost shredder, it'll serve as a prime example of healthful, *appropriate* technology.

EDITOR'S NOTE: Membership in the IHPVA—which includes a subscription to the association's newsletter, Human Power—*is open to anyone interested. Annual dues are $15 in the U.S. ($17 in Canada and Mexico) and should be directed to IHPVA, Dept. TMEN, P.O. Box 2068, Seal Beach, California 90740.*

A good deal of last-minute preparation is essential. The drive mechanisms cover the spectrum from conventional chainwheels and derailleurs to those modified with outsized sprockets to linear-action designs. Upsets—even at 30 or 40 MPH—present only a minor nuisance because of the vehicles' light weight and tough Kevlar or composite fairings. The 1/4-mile dragstrip sprints and the nighttime velodrome pursuits offered a nice balance to the longer road events.

Indianapolis' Eagle Creek Park presented contestants with challenging hills and curves in a beautiful setting. Two-, four-, and five-person vehicles all vied for victory in the multiple-rider class, which was dominated by university engineering students. The "flying start" speed trials at the site of the Indy 500 resulted in the highest velocities of the championships weekend: just at the legal speed limit! Road course entrants approached speeds of 40 MPH. Practicality as well as speed is important: The machines should be repairable and maneuverable.



[1] Bird's-eye view of the low-cost earth shelter, near completion. [2] A curved top plate must be cut from 2 X 12 to go above the kitchen windows. [3] A Squangle in use. [4] Beams were end-nailed through the first cross rafter. [5] From behind the building, you can see the first layers of waterproofing. [6] Rafters in place above the bisecting wall. [7] The interior partitions must bend to fit the conical rear roof.

We're ready to prove, once again, that energy-efficient housing doesn't have to be expensive.

MOTHER'S $10-PER-SQUARE-FOOT (OR LESS!) EARTH-SHELTERED HOUSE: PART II

Is it possible to achieve food and energy independence on one acre? Well, with imagination, hard work, and the right *one acre, we think it might be done . . . and that's what this project is all about. Of course, providing most of the basic needs for four people from such a small piece of ground is a tall order. Still, we think it's a goal worth pursuing, and we hope that in this series of articles about our low-cost homestead we'll be able to help some of you in your struggles to increase your self-reliance . . . by doing some of the experimenting for you.*

In our first installment, we discussed our plans for this project—which include our round, earth-sheltered home . . . an independent, low-voltage DC electrical system run from hydropower . . . and permaculture agricultural schemes—and described the construction methods used to raise the circular building's block walls. This time, we'll go into the intricacies of framing the domicile. (For readers unfamiliar with construction jargon, we've included a glossary of the terms marked with an asterisk.)

On most construction projects, it's a real milestone when you get to the point where you can have a sheltered work-and-storage area . . . *particularly* when you're working through the winter (as we were!). Yet before we could get a roof overhead, we had to begin the framing of the round earth-sheltered house by erecting the full-diameter, east-west partition. Because all of our building's rafters bear on this wall, its completion was the key to getting to work on the roof structure. And though the wall is a fairly standard 2 X 4, 16″ on-center* partition—with openings left for the bedroom and bath doors—the job *is* complicated somewhat by the special reinforcement above the door headers and the 1-in-12 pitch* of the top plates*. Consequently, it's a good place to "get one's feet wet" with *unsquare* framing . . . and to learn some of the skills that will be important to the successful completion of this admittedly complicated stage of our house's construction.

Because the west top plate overhangs the exterior block wall, the main partition can't be framed on the floor and lifted into position, as is often done. Instead, we found it best to start by securing the sole plates to the concrete slab with expansion anchors or a nail gun, so that their centerline bisected the circle of the building. This left the north side of the east sole plate flush with the north side of the pilaster* on the bermed wall.

To match the top-plate pitch, the upper ends of the studs had to be cut at a 5° angle for a snug fit. (The calculated dimension of this angle is actually 4-3/4°, but the 5° approximation is plenty accurate.) We started the wall by anchoring the end studs to the concrete block and cutting one of the doubled top plates for each side to the appropriate length.

To support the top plates during framing, it's possible either to erect a temporary center pole—as we did—or to prepare the rough opening* for the bathroom door. Because the building's center post bears on the bathroom-door header*, the structure above this opening must be somewhat reinforced. When we reached this stage, we set in a doubled 2 X 12 block to support the east top plate, and stiffened the whole assembly with 1/2″ plywood on both sides of the header box. In order to serve as a construction post, this rough opening should be put together on the floor, and the assembly should be lifted into position and propped. Then the plates can be nailed to the laminated 2 X 4 central post, the trimmers* from the door frame, *and* the 2 X 12 block.

The remainder of the framing consists of preparing two more reinforced door headers, where cross rafters* tie into the bisecting wall, and filling in the 16″ o.c. studs. Though it would be possible to calculate the length of each stud, it proved just as easy for us to cut them to fit. We simply laid each board up against the top plate, marked the cut with a pencil, set the trimmed stud in plumb*, end-nailed it through the top plate, and toe-nailed it to the sole plate. After the wall was framed, we went back and added the second layer of top plate.

FRONT ROOF

We used homemade flitch-plate (or "glue-lam") beams for our rafters. Since they consist of a section of plywood sandwiched between two conventional boards (thereby adding the plywood's multidirectional strength to the more one-directional capability of the boards), they're quite strong. Such beams are approved for construction practically everywhere, but some building codes stipulate that they may be *designed* only by architects or engineers. Fortunately, we're without such restrictions, so we consulted load tables for flitch-plate beams from *Architectural Graphic Standards* to determine an appropriate spacing for the rafters in our building. A good deal of conservatism is built into the tables, and we introduced a generous amount of our own by using 48″ maximum spacing to allow for easy sheathing and drywalling.

Using glue and nails, we built up our flitch-plate beams from lengths of 2 X 10 secured around 3/4″, or doubled 1/2″, plywood cut to size. The main north-south beam on the front roof drops from the top of the east plate (over two jacks* in the central post) to a point just east of the front-door opening at a 1-in-12 pitch. This, and each of the other southwest rafters, was bird's-mouthed* approximately 3/4″ deep and 8″ wide where it rides on the sill. Once we got that initial beam in place, we removed our temporary bracing for the east-west bisecting wall to make the floor less cluttered.

Next, we prepared the cross rafter to which the three southwest jack rafters are attached. This was done by cutting out a section of 2 X 10, mitered* at both ends, long enough to penetrate the area above the west bedroom header and rest atop the 2 X 12 blocking. This board was notched to fit into the slot above the blocking. To this first cross rafter, we attached a ledger* strip cut from a piece of two-by lumber . . . then each jack rafter was notched to hang on this ledger.

All three jack rafters have different compound angles, requiring double cuts where they intersect the cross rafter. The additional notching needed to fit the ledger, however, increases the number of saw cuts on those ends to four. The portions of the jack rafters that overhang the exterior wall were then bird's-mouthed, the beams were set in place, and their inside ends were nailed through the cross rafter. When all three were in position, we added two more cross rafters for reinforcement, nailing them into the back of the first. Then we went ahead and installed some of the 2 X 10 bridging to keep the rafters square.

Each of the four rafters that span from the east bisecting wall top plate to the front of the building has a different pitch . . . and the result is that the roofline describes what is called a *hyperbolic paraboloid* as you move from the center to the southeast. Because all four of these rafters were to bear on the beam that would span the greenhouse opening, the next step in construction was to build up that beam from five 2 X 6's on edge, with 2 X 8's lying flat on the top and bottom. We used a pressure-treated 6 X 6 post in the center of the beam's span for support, and finished the horizontal member with tung oil to enhance its appearance.

Because the four southeast rafters bear flat (with appropriate bird's-mouths) on the east bisecting wall top plate, they arrive at the front wall tipped sideways at a 5° angle . . . representing the 1-in-12 east-west roof pitch. Consequently, the bird's-mouths where the rafters ride on the greenhouse beam had to be cut at compound angles, with the tipping-angle cut being more pronounced than the bird's-mouths themselves. It's important to cut these compound angles into the ends bearing on the greenhouse beam, rather than the ends on the wall top plate, so that top and bottom surfaces of the rafters run parallel to the sheathing and interior finish materials.

Bridging these four rafters with 2 X 10's was a fairly time-consuming chore, since there were a number of different angles involved. For this job, our carpenters found a Squangle nearly indispensable. This tool, made by the Mayes Brothers Tool Manufacturing Company of Johnson City, Tennessee, allows one to accurately reproduce odd angles while maintaining plumb with a built-in bubble level.

(continued on next page)

(continued from preceding page)

Once we'd finished the bridging, we moved on to getting the front half of the roof overhead. On the southeast portion of the roof, full-width pieces of plywood could be used between the 4′-spaced rafters, but the area over the radial rafters on the southwest roof required a number of triangulated cuts. This proved to be a blessing in disguise, though, since we were able to find some salvaged plywood, which had been cut into parallelograms, for a very reasonable price. On our roof, working with the odd-shaped material was no disadvantage, and we saved at least $2.50 per sheet.

We used salvaged roll roofing (lapped 18″ and sealed with cement) for the top layer, though we seriously considered using a sprayed-plastic coating suggested to us by architect Angus Macdonald. (See page 150 for more about Angus' work.) The roll roofing won out in the end, simply because it was so inexpensive . . . however, we had little doubt that the plastic would outlast it by a wide margin. An additional potential benefit to using the plastic is that polyurethane foam insulation can be sprayed on beneath it, thereby eliminating the need to install fiberglass insulation between rafters. Furthermore, the plastic can be continued on down earth-bermed walls as a structure's waterproofing, forming a continuous sheet over and around the building. In this aspect of construction, as in so many others, one must weigh savings against durability and the labor involved.

REAR ROOF

The northern section of roof has a 1-in-3 pitch, and all the rafters have the same bird's-mouth angles. Of course, the inner ends of three of them—the east, north, and west—are square-cut at an 18-1/2° angle, but the remainder intersect cross rafters in the same fashion as did those on the front roof. The first beam to install is the north-south peak rafter, which needs to be almost 23 feet long. By this stage of construction, though, we'd run out of salvaged 2 X 10 X 24′ boards, so we built the beam in two sections . . . and supported the adjoining ends on a post in the 2 X 6 plumbing wall between the bathroom and the bedroom closets. It would be preferable to run a continuous rafter here. Nonetheless, the support post should be retained, since this one rafter carries considerable load distributed from the other rafters that join it by way of the two cross rafters.

The remaining beams were cut and installed in much the same fashion as were those in the southwest rafter section . . . with a single cross rafter installed first, the jack rafters set in place (without a ledger, which is not needed on such a steep pitch) and end-nailed, and then the remaining layers of cross rafter backed against the first. There was even *some* duplication of cross rafter intersection cuts, since the angle of each northeast rafter matches that of one on the northwest.

Once the main rafters were up, we installed the bridging, leaving a 2″ fire clearance where the chimney would penetrate the roof. And before sheathing the back roof section, we went ahead and laid up the chimney block (16″ X 21″ concrete units with 8″ tile liners), so that the woodstove flue could be flashed properly when we installed the roofing.

The clerestory formed by the junction of the 1-in-3 rear roof pitch with the 1-in-12 front allows plenty of daylight to reach the bedrooms and bathroom. But to protect against summertime overheating, we decided to add an overhang (or *eyelid*, as we've anthropomorphically dubbed it). This projection consists of 2 X 10's angling out from the east and west rafters to form a point overhanging the center post.

Sheathing and sealing the rear roof went much the same as did that job on the front, except that—because of the steeper pitch—we had to maintain only a 12″ overlap on the roll roofing. Still, we used plastic roofing cement liberally under the joints.

The partitions between the bathroom and the two bedrooms were fitted against the underside of the rafters, and each stud had to be cut to length and forced into place against its top plate to push that board up against the rafters. Because the top plates had to both bend and twist, it was important that the studs be cut to the right lengths and angles to insure a solid fit. This bit of framing turned out to be the trickiest—or at least most *frustrating*—part of the entire construction. It could have been made much simpler by running all interior walls on a radius of the circle . . . but unfortunately, the resulting rooms wouldn't work well with conventional rectilinear fixtures, such as a bathtub, washer-dryer, and so on.

As you can see, "drying in" this building required some creative construction techniques . . . but the resultant savings in materials were probably the essence of the building's low cost. In the next installment of this series we'll be able to detail the waterproofing and insulation measures, and move right along to some of the elegant finishing touches that you've seen in the pictures in this and the last issue of MOTHER. Be sure to be on hand for Part III . . . when you'll find out about our experimental waterproofing techniques.

EDITOR'S NOTE: By the time you read this, MOTHER's Plans staff will have finished a set of construction drawings covering the important aspects of building our $10-per-square-foot (or less!) earth-bermed house. The package will include framing and rafter details, block layout, plumbing and electrical lateral configuration, and even cross sections of cabinetry for the kitchen. Although these drawings are not *architecturally approved plans, they do cover the structural aspects of construction in enough detail to help an owner-builder design his or her own code-approved blueprints. To obtain your set, send $15 (plus $1.00 shipping and handling) to MOTHER's Plans, Low-cost Earth Shelter, P.O. Box A, East Flat Rock, North Carolina 28726.*

GLOSSARY (in order of appearance)

On center: The distance from the center of one board's width to the center of another's. Abbreviated o.c.

Pitch: The angle at which a roof rises, expressed, for example, as a rise of one foot in 12 feet . . . or a 1-in-12 pitch.

Plate: A horizontal (or nearly so) board or boards lying at the top or bottom (sole) of a stud wall.

Pilaster: A reinforcing column tied into a masonry wall.

Stud: A vertical member in a framed (or stud) wall . . . usually a 2 X 4 or 2 X 6.

Rough opening: The spacing of an opening before trim boards are added.

Header: A horizontal member (of double or triple boards or metal) that transfers the weight above a door or window frame to the adjoining full-height wall members. Or, a member which transfers the load from joists around an opening in a floor.

Trimmer: A stud that runs full height in a door or window rough opening. Jack studs (see below) are nailed to it.

Plumb: Vertical.

Bird's-mouth: A notch cut across a rafter so that it fits snug on a sill or plate.

Sill: Similar to a plate, this board usually lies on top of a masonry foundation or wall.

Cross rafter: Special term made up for this article to describe one of the short support rafters near the center of this house. Might also be described as a header.

Jack: Any rafter or stud that does not run full length. In this text, it is also used to describe what carpenters sometimes call a "cripple".

Miter: Cut at an angle . . . assumed to be 45° if no specific angle is mentioned.

Ledger: A strip of wood nailed to a main member, from which notched intersecting members can be hung for temporary support during nailing.

Bridging: Boards nailed between main members to prevent them from twisting and to distribute the load evenly.

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(continued on page 174)

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TMEN-2

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It's hard to beat government auctions of confiscated craft when you're looking for . . .

BARGAINS AFLOAT, BARGAINS AFLIGHT

Roger Hoffmann

Have you ever wanted a boat? Not a canoe or a rowboat, mind you, that's not what I mean. I'm talking about something *substantial,* something you could *live* aboard and use for commercial fishing or other maritime enterprises . . . a shrimper, trawler, tug, or freighter, say. A nice dream, isn't it? Unfortunately, most times the *cost* of a toy like that is virtually guaranteed to keep your dream boat just that . . . only a dream.

And likewise, the idea of owning an airplane is out of the question for the average person, even when you consider the money-making possibilities of bush-piloting, back-country transportation, and such. The outrageous price tag pretty well dictates that—for most of us—our only flights will be those of the imagination.

But owning a live-aboard boat doesn't have to be just a dream. And piloting your own airplane doesn't have to remain in the category of a fantasy. Why not? Well, did you see the article "Uncle Sam, Your Friendly Auctioneer" just last issue (on page 92)? If not, it's worth a peek, since it describes the fantastic bargains to be found at U.S. Customs Service auctions of abandoned and confiscated import goods. What I'm about to reveal to you here is closely related to that article, but has a different twist: It's about auctions of seized *vehicles*—usually boats and planes—courtesy of Uncle Sam and his various long arms: the FBI, DEA, USCS, BIN, and a number of other acronymic law-enforcement agencies.

Want some examples? How about a 40-foot commercial lobster boat with a V-8 Detroit diesel for $1,600 . . . or a 56-foot trawler for $6,500? Maybe you'd like a slick little 52-foot motor sailer for only $7,000? Tell you more, you say? OK. Recent Government Accounting Office figures show that the federal government has in storage—right now—some $82.1 *million* worth of confiscated boats, planes, and other ex-smuggling vehicles! With that kind of inventory to choose from—at unbeatable auction prices—who's to say that *your* dream machine isn't just waiting for you to sail or fly it away for (relative to what such things normally cost) peanuts?

HOW DO THESE AUCTIONS WORK?

Here's how: An agency—the Drug Enforcement Administration, let's say—makes a bust, and a boat- or airplane load of imported marijuana falls into the hands of the law. A routine search for the owner is run, and the vessel is placed in storage . . . pending litigation to decide who owns what (creditors often enter the picture at this point). If the courts determine that the craft is now government property, an auction is announced . . . but not too *loudly,* as it turns out. In fact, most of these sales are advertised in the local papers only.

So the trick to having access to these government sell-offs is to *know about* them. And with the large number of law-enforcement agencies involved, that can be quite a trick indeed. Until recently, a serious would-be bidder had to call each of the agencies frequently to keep abreast of the what, when, and where of the different sales. But that's all changed now.

"NABBING" AUCTION INFORMATION

These days, there's a boat-brokerage firm in Fort Lauderdale, Florida that'll do all the phone work *for* you (for a price, of course). The outfit is called the National Auction Bulletin, and consists of a handful of folks who spend their days with phones stuck to their ears and their fingers on typewriter keys . . . putting out a twice-monthly information newsletter that wears the same name as the business ("NAB" for short). In 1983, NAB listed more than 300 boats and planes set to be sold at 70-some auctions in 50 different cities. And in addition to the basic bulletin, NAB offers services such as inspection reports for potential bidders who can't visit certain storage locations in person.

Here's an example of what you can expect to find in a typical NAB entry:

56' Bay Trawler M/V "Thomas E"
w/335 hp Detroit Diesel Engine.
U.S. No. xxxxx.
Seizure No. 81-5201-xxxx.
Deposit of $5,000.

Once you learn to read the abbreviated entries, you'll see that the listing above gives the size and type of boat, its registered name and number, the size and type of engine, the year of seizure (first two digits of the seizure number), and the deposit required to qualify you as a bidder. Not all auctions stipulate a bidding deposit, and a deposit *doesn't* constitute a bid, or even a minimum-required bid. (In the case of the *Thomas E,* the big net-dragger was appraised at between $18,000 and $25,000, and was sold to the highest bidder for a mere $6,500.)

AUCTION LOCATIONS

A scan of the last few issues of NAB shows that auctions were held in California, Colorado, Delaware, Florida, Georgia, Massachusetts, Michigan, North Carolina, Oregon, Puerto Rico, and Rhode Island. Though the highest number of auctions are held in coastal and border areas of the country, the sales have to follow the smugglers . . . and with all the things Uncle Sam has decided to deny entry to, smugglers are just about everywhere these days. So, almost no matter *where* you live, you're likely to eventually find the boat or plane of your fantasies at one of these auctions. And if the vessel of your dreams isn't stored nearby, mail-in bids are generally accepted.

CAVEAT EMPTOR

If you decide to participate in an auction, keep in mind the age-old economic wisdom of *caveat emptor,* or "let the buyer beware". No, that's not to say that the government's out to stick you with a lemon . . . just that there're a few game rules you'll want to know before plunking down your hard-earned loot. Let's run through the sequence.

With a copy of NAB in hand, you call or visit the auctioning agency and make an appointment to inspect the craft you have your eye on. Usually, you won't be allowed to start the engine(s), but you *can* poke around to your heart's content. If you doubt your own skill at appraising the condition and value of a Douglas DC-3 with twin Pratt & Whitney 1,350-horsepower radial engines, bring along an aircraft mechanic. On the other hand, if your target is a boat—and you *really* want to know what you're getting into—bring a snorkel, mask, and swimsuit so you can inspect the submerged portions of the hull . . . or hire a marine surveyor to do it for you.

In short, know exactly how much that craft is worth to you *before* the auction begins . . . then set a limit above which you won't bid . . . and *stick to it!* Also, be sure you know the policies of the agency doing the selling. For example, the U.S. Customs Service requires a 25% down payment on the total price of the sale *at the time of purchase* . . . in cash or certified check only (of course, if you already paid a bidding deposit, that could be put toward the down payment). You'll then have a specified time—usually one to five days—in which to come up with the balance (also in cash or certified check). If you don't pay the balance on time, the customs folks will keep the sale item *and* your 25%!

On a more positive note, though, most of these government auctions are "absolute", meaning that the highest bidder takes the goods . . . even if the top bid is only $100 for a vessel with an appraised value of $20,000 or more. (In some cases, however, the auctioning party reserves the right to set a minimum bid, especially when a lending institution has a lien on the craft.)

To sum up the bargains that're available at these "smugglers' sales", the Government Accounting Office figures that Uncle Sam gets an average of 39% of the appraised value of the vehicles he auctions off. That's only an *average,* mind you. You could do *much* better.

MAKING IT HAPPEN

If you want to give it a go, the first step is to sign up for the *National Auction Bulletin.* A one-year subscription (24 issues) is $35 and includes a free Info-Pack with specific auction details, a history of selling prices, and worthwhile scoops. (Or, for $7.50, NAB'll send you the Info-Pack and one sample issue of the bulletin.) Write to NAB, Dept. TMEN, 230 Basin Drive, Fort Lauderdale, Florida 33308.

Bargains afloat and bargains aflight . . . they're out there within your reach, so happy bidding!

DEAR MOTHER,

(continued from page 12)

At a recent yard sale, I picked up a biography of Elbert Hubbard, writer, publisher, and a founder of the arts-and-crafts movement in the United States. (He died in the sinking of the *Lusitania* in 1915.) The book included the names of well-known people who visited Hubbard at his Roycroft Inn in East Aurora, New York. Among them were Woodrow Wilson, John D. Rockefeller, James Whitcomb Riley, Clarence Darrow, and—famous even then—*Scott Nearing*.

John P. Reid
Bear, Del.

Like many others, we were saddened to hear of the passing of Scott Nearing. Although we never met him, he provided a great deal of inspiration to us in our efforts to attain the "good life". His full and productive life is proof that a simpler existence is the only sane alternative for the future. Although Scott has returned to the earth from which he came, his ideas, goals, and dreams will not be forgotten.

Brian and Andrea Blair
New Plymouth, Ohio

I hope that I speak for many of MOTHER's readers concerning the death of Scott Nearing. I find that I have no grief for the passing of his body . . . only great joy for the gift of his spirit.

Polly French
Hadley, Mass.

I am not at all pleased with the implications of the photographs used to support the article "Buying an Existing Earth-Sheltered Home" on page 84 of issue 83. As you (and I'm sure some of your readers) know, my house,

"The Hobbitat" (featured in MOTHER NO. 68), was—with my permission—used as a "model" to illustrate the article. I was prepared to make explanations to my friends about the "For Sale" sign in my front yard . . . but not at all ready for the leaky ceiling shown in the fourth photo. I don't know where you took the photograph, but it certainly wasn't in *my* house . . . yet as a result, the connotation is that The Hobbitat is defective in a critical function, one in which its performance has in fact been excellent. Needless to say, neither my family nor the architect who designed the structure appreciates this erroneous publicity. We would all feel some sense of satisfaction if you would set the record straight by letting your readers know that The Hobbitat has provided us with economical and comfortable shelter since the day it was completed.

Lloyd D. Remington,
Asheville, N.C.

I'd be more than happy to reinforce that fact, Lloyd. As you know, that article was an excerpt from the new book, *A Practical Guide to Earth Sheltered Housing*, by Mary Rollwagen, Susan Taylor, and T. Lance Holthusen. Occasionally, when excerpted chapters are used in the magazine, I include photographs both as a visual aid *and* to break up what would otherwise appear as a solid wall of copy. In the case you mention, features of more than one structure were shown with the article. That leaky ceiling photo, taken in a different house entirely, was used to support a point made in the excerpt . . . not to target your fine home as deficient in any way. I apologize if our positioning and choice of photos made it appear to some people that The Hobbitat was faulty.—MOTHER.

Please let your readers know that the K & K Paper Brick Press (which converts old newspapers into low-cost heating fuel) mentioned in MOM's Marketplace in MOTHER NO. 84 costs $39.95 plus $2.50 for shipping and handling, and not $49.90 postpaid as you listed.

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We were surprised but delighted with the article on page 88 of issue 84, entitled "Grapevine Wreaths". That piece followed very much the same line of thought as an unfinished story by my 12-year-old son, Eric.

The author of your published article, however, doesn't follow one procedure that Eric recommends. He *bakes* the circled wreath on a cookie sheet in an oven set at 350°F for about 10 minutes. While the color of the finished ornament may be slightly changed by the heating, Eric says that the warmth will set the wreath permanently to its shape. It will also drive out—or kill outright—any mites or aphids that might be lurking within the vine coils!

Unfortunately, Eric was able to complete only one wreath last year. He gave it to me, but—before he could finish one for my sister and her family—an accident (during a playful scuffle) resulted in the enclosed picture. All of

a sudden, no more wreaths! And no article! There went all the dreams he had of saving some money for Christmas shopping!

Susan (and Eric) Counceller
Liberty, Ind.

We have a serious termite problem, and the exterminating company we contacted recommends tenting our home and fumigating the entire building with a poisonous gas called Vikane. I can't bring myself to go along with this method. Does anyone know of a natural means of control we can employ instead?

Jackie Greenstein
Ventura, Calif.

(continued on page 188)

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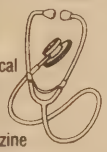

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(continued on page 180)

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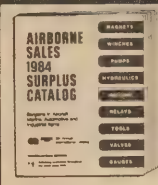

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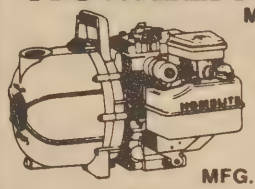

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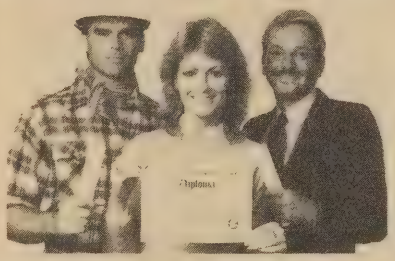

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THE MAKING OF A CEDAR DUGOUT CANOE

Jim McDowell

For centuries, the enormous western red cedars that grow along the coast in the Pacific Northwest provided the people of that region with an extraordinary—and very beautiful—form of seagoing transportation. Using only the simplest of tools, artisans carved gracefully contoured dugout canoes (some of which measured more than 60 feet long!) from single logs of this fine-grained, rot-resistant wood. The skill with which the great trees were fashioned into functional floating sculptures—boats that were used for everything from daily fishing to major voyages—became a hallmark of many tribal cultures.

Today, however, the art has all but vanished. So when my neighbor, log-house builder Earl Carter, convinced the well-known Canadian sculptor Norman Tait—a Nishga Indian—to come to our seaside village to carve an authentic Northwest Coast-style dugout, I jumped at the chance to observe and record the process.

Mr. Tait spent two weeks here in Gibsons, British Columbia transforming—with Earl's able assistance—a red cedar log into a traditional 15-foot vessel (a work of art that he later shipped to Ottawa to exhibit at the Canada Canoe Festival). As you can see from the photos, the process was dramatic . . . a gradual emergence of form from a forest giant. Perhaps with the description that follows, you'll be inspired to create a similar craft and, along with Tait and Carter, help perpetuate the skills of boat builders long since gone.

FIRST, A PLAN . . . AND A LOG

Like any major construction project, the making of a canoe requires a basic design, or blueprint. Tait—an expert wood-carver—actually *whittled* a miniature vessel (scaled 1 inch to the foot) based on museum photos and drawings . . . and then used the small model to help him determine the dimensions and form of the "real" canoe. Although this is probably the best way to get a feel for the undertaking, those of you who are less practiced with a knife can simply *draw* a design (you'll probably want to render side, top, bottom, fore, and aft views) for the same purpose. In any case, establish a plan and define the shape and dimensions of the canoe you want to build, so that you'll have a guide of some sort to follow.

With that done, you can concentrate on locating a suitable "blank": Look for a sound red cedar log that's thick enough to give you plenty of solid meat to work with after the bark and sapwood have been peeled off (Tait chose a timber that was about 18 feet long and measured approximately 40 inches at the small end and 46 inches at the base). You'll need a specimen with as few defects as possible, too . . . one or two minor checks (cracks in the wood) *are* acceptable, but rot and knots can pose serious problems. At least half of the log—the top or bottom when it's viewed horizontally—should be more or less free of such flaws.

Unless you're willing to pay a lumber company several hundred dollars for the wood, search along an open beach for a drift log (or hire a beachcomber to find one for you) . . . and then either work on the canoe on the spot or haul it—by boat or truck—to a convenient site. Cutting a live tree, of course, is an option open only to owners of cedar-forested land or to individuals who have *permission* to cut on private property.

LAYOUT

At the work site, peel off the bark and—using peaveys or a come-along—roll the tree so that its knot-free half is facing down. You'll also need to decide which end will be the stern . . . in Tait's case, it had to be the log's butt, since his design called for a relatively tall stern-end stem.

Next, locate and mark the approximate center of one end, and then draw perpendicular lines intersecting that point, as shown in Fig. 1 (snap a chalked plumb line from

top to bottom to produce the vertical mark, and use a pencil and a level or square to establish the horizontal plane). Repeat the process at the other end.

With that accomplished, "quarter" the timber longitudinally by snapping chalk lines along the face of the log to connect the four outermost points of the bisecting lines at one end to the corresponding points at the other. You'll have to turn the log over, of course, to achieve this on the bottom side.

Now, with the log still upside down, locate what will be the canoe's lower hull line at each end and mark it parallel to its companion horizontal line. Be sure when setting this line that you come down from the base far enough to provide plenty of extra working width on both sides of the hull, but not so far that you won't have enough wood to accommodate the height of the craft's sides. (Tait, for example, positioned his line 6 inches from the log's bottom.) Then snap off a line along each side of the log to connect the outer points of the hull mark at one end to those at the other (again, see Fig. 1).

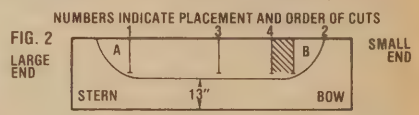
BLOCKING OUT

At this point you can start blocking out the general shape of the canoe, using the chalked guidelines to help you maintain your intended design.

While the log is upside down, flatten the bottom by using wedges and a sledge to cleave off wood (the shaded section in Fig. 1) until you reach the marked hull lines. (This shouldn't be hard: Cedar is an exceptionally straight-splitting wood.) Then turn the log right side up and—with a carpenter's or grease pencil—sketch in the sheer (deck line), including upturned stems if your design calls for them (as did Tait's), on both sides of the log. To establish the sheer, measure and mark a uniform distance up from the hull line (Tait came up 13 inches) at several points along each side.

Now, you can proceed to remove the large section of log above the sheer . . . a chain saw, although obviously not a traditional tool, makes short work of the job. Using Fig. 2 as a guide to the placement and order of the vertical cuts you make, saw down to within 3 inches of the actual deck line at the four points indicated. Then—with a sledge and wedges—pry out the small chunk between cuts 2 and 4 (the shaded area in Fig. 2), angling the wedges upward, of course, to avoid cutting into material that you may need. Finally, chip out the two large chunks between cuts 1 and 4—again using wedges—and chop off any remaining high spots with a double-bladed ax.

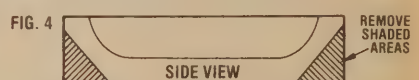
Leaving the two pie-shaped pieces at the ends (A and B in Fig. 2) in place for now,



stand on top of the log and sketch the angled-in bow and stern sides on the surface, as shown in Fig. 3. Then—starting about an

inch outside your lines (to make sure you'll have plenty of wood to work with)—cut those four corner pieces off with your chain saw. With that done, you can go back and remove the two pie-shaped pieces mentioned above, again allowing at least an extra inch outside your mark just to be safe. (Actually, when Tait and Carter were blocking out their canoe, they cut the four corners off *before* removing any wood above the sheer . . . but in retrospect, it seemed clear that chopping out the excess material above the sheer first would've made determining the correct bow and stern angles easier.)

Next, sketch in the lower line of each stem on one side of the log (see Fig. 4) and—



since you want the stems to be as symmetrical as possible—make cardboard templates of the delineated areas and use them to transfer the lines to the *opposite* sides. Once you chain-saw the triangular sections off, your canoe will be completely blocked out.

ROUGH SHAPING

Now, you're ready to begin giving the vessel its basic contours. For this job, Earl and Norman used a double-bladed ax, a store-bought broad adz, and a homemade el-

bow adz (see the accompanying sidebar). If you lack experience with these instruments, take some time to practice using them on the chunks of wood you've already removed. Get a feel for the tools and for the way cedar in particular responds to them.

You can start shaping the canoe by hollowing out some of the hull's interior with your ax and/or chain saw. Don't cut very deep, though . . . the idea at this point is simply to remove enough excess wood to reduce the canoe's weight somewhat (which makes maneuvering the log a bit easier) and to allow the interior to begin drying uniformly (which helps to keep checks from developing).

Roll the log over so that one side is facing upward: The task at hand is to concentrate on shaping *that one side only*. Using your ax, broad adz, and elbow adz, work the wood a little at a time so that the desired contours gradually *emerge* from the cedar. The key here is to proceed very slowly, and—especially when you get close to achieving the shape you want—to make shallow cuts, perpendicular to the grain, so that you won't cut too deeply. This entire process, of course, is highly subjective . . . your only real guides are your own artistic instincts (and your scale model, if you made one). So work carefully—roughing out not only the curvature of the side, but also the stem ends—until you and your sense of design are satisfied with the end product.

At this point, you can begin to transfer the basic form you've created to the canoe's *other* side. Roll the log upside down onto blocks that are high enough to support the deck and keep the stems off the ground. Then strike a series of parallel lines—spaced about 8 to 10 inches apart—across the flat underside and perpendicular to the keel line (the exact longitudinal center of the canoe).

Now, make a simple measuring device by tying a nail to one end of a short length (about 14 inches) of string. Then hold the nail on any one of the parallel lines, at the point where that mark touches the side edge (where the bottom stops and the side begins) on the shaped half of the hull. Stretch the string along the line until it reaches the keel mark . . . hold the cord down at that point . . . swing the nail around to the other side . . . and—with the string pulled taut—score an arc with the spike across the sketched line. By repeating this scribing process on all of the parallel lines, and then drawing a longitudinal line connecting these marked points of intersection—where each arc crosses its corresponding line—you'll establish the second side edge. On Tait's canoe, the distance between the two from beam to beam (in other words, the width of the base at its widest point) worked out to be 16 inches.

Tilt the canoe so that the unshaped side is facing skyward, and start contouring its surface . . . since you have an example to follow this time, you should be able to accomplish this fairly quickly. When you achieve what seems to be a rough mirror image of the opposite side, roll the vessel upside down again, eyeball your work to compare the slope of one "wall" to that of the other, and hew off any wood that is necessary to make the canoe's contours symmetrical.

(continued on next page)

PHOTOS BY THE AUTHOR AND ANNA VAUGHAN

[1] Carter, Tait, and a friend flatten the canoe's bottom. [2] Carter chops away the first chunk from the log's "top" and . . . [3] pries out a large section. [4] With the waste wood removed, Earl uses an ax to shape the prow and [5] hollow out some of the interior. [6] While Tait sculpts the sheer line with a curved knife, Carter rough-shapes the hull. [7] A broad adz is ideal for contouring large areas. [8] By working carefully and slowly, the two craftsmen gradually coax the canoe's graceful shape from the cedar.

(continued from preceding page)

Next, to make *sure* the vessel's curvature is uniform, first use your nail-and-string measure—and the parallel line/arc technique described earlier—to strike longitudinal lines on the hull that are 1, 6, and 12 inches from the keel. Any bulges in these lines will indicate where wood must be removed.

Then, to check the full slope of the sides, lay a leveled board across the middle of the canoe's bottom (as shown in Fig. 5) and

drop a plumb line from the plank at a measured distance from the keel. Mark the point where the plumb bob touches the hull . . . and then repeat the process on the other side, using the same keel-to-string span and the same amount of plumb cord. The spots marked on both sides *should* be equidistant . . . if they're not, remove some wood from the side that is protruding and check the slope again. Once the measurements *are* equal, move the string farther out on the board, and lengthen the plumb line so that the bob touches the hull just an inch or so below the sheer. Compare (and, if necessary, correct) the contour of each side at that point, too.

When you've finished rounding off this entire middle section to the curvature you want, make a template of the contour to use as a guide for the rest of the canoe: Rive out an inch-thick cedar board about 2 feet long and 6 inches wide, and—with your adz—carve a concave curve into it that matches that of the hull from one side edge to the sheer. Then sculpt the rest of the canoe's body to mimic this pattern. For a *really* precise "fit", you can coat the curve of the template with a graphite lumber crayon dipped in water, and then run the board on the part of the hull you're working. The graphite will rub off on any high spots, which then can be chipped away.

HOLLOWING THE HULL

After you've rough-shaped the exterior, roll the canoe right side up and resume hollowing out the inside. Remove large chunks with your ax and chain saw, and then use the round-bladed cooper's adz to form the curved interior walls.

When you've worked the sides down to a thickness of about 3 or 4 inches, you'll be

[1] Skillful hands guide the curved knife. [2] Carter finishes the rough-shaping, using a homemade elbow adz. [3] Tait resumes hollowing out the hull. [4] Earl drills depth-guide holes and . . . [5] the two men excavate the interior down to the cavities. [6] Tait and Carter plan the final shaping, which [7] is done almost entirely with Norman's self-crafted D-adz. [8] Sharp tools are a must! [9] Tait shapes a stem with the elbow adz. [10] Norman and Earl load the finished 150-pound canoe in a van, for shipping to Ottawa.

ready to establish depth guides. Turn the boat upside down and—starting at the exact center of the bottom (see Fig. 6)—drill 1/4"-diameter holes, 2 inches deep and one hand (about 4 inches) apart, into the wood all along the keel. Then bore another row of holes (using the same depth and spacing) on each side of the drilled line, one hand away from—and parallel to—the keel.

Now, still utilizing the one-hand measure, continue boring rows of holes up the sides of the canoe (see Fig. 7) . . . but decrease the depth of the cavities in the third

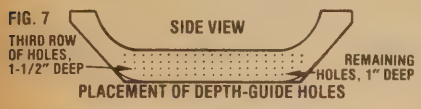


FIG. 7
PLACEMENT OF DEPTH-GUIDE HOLES

line out from the keel on each side to 1-1/2 inches, and in subsequent rows to only 1 inch.

Once all the depth guides have been established, turn the vessel right side up again and use your adzes to hollow out the interior until you work down far enough to *expose* all of the holes . . . the result will be an *almost* finished hull that tapers gradually from a 2-inch thickness on the bottom to 1-1/2 inches at the bilge line and 1 inch up the side.

Of course, this process also produces a *very* leaky boat! I have to confess that when Tait and Carter started sinking a drill into the exterior of their beautiful, masterfully shaped canoe—and then chopped the inside away until (gasp) the cavities ran all the way through—I could barely contain my shock. But they assured me that the technique is a traditional way to create a hull with a uniformly graduated thickness, and that they'd eventually plug the openings permanently to restore the canoe's seaworthiness.

FINAL SHAPING

You don't want to fill the depth guides just yet, however, because you'll need them to help you gauge your final finishing work. Using the D-adz and curved knife—and proceeding *very* carefully, never taking a substantial amount of wood from any one spot at a time—shave and shape the hull to a thickness of about 1-1/2 inches on the bottom, 1 inch at the bilge, and 3/4 inch along the sides. This process requires *hours* of delicate carving, on both the interior and exterior, and demands a high degree of patient artistry: If you work too quickly, you'll remove more wood than you want from a given area and lose the contours and/or thickness for which you're striving.

Once you've achieved the desired shape and thickness (congratulations . . . you're nearly done!), you can proceed to fill the depth-guide holes, one at a time. First, stuff a bundle of tender spruce buds into an opening, and then drive a short, sharpened 1/4"-diameter cedar peg into one side of the cavity, and then *another* peg into the *opposite* side, so that the two whittled tips intermesh tightly. The wooden pins crush the spruce needles . . . which in turn release a sticky resin that glues the wedges together to form a permanent, watertight plug. Now, go ahead and trim off all of the wood that protrudes from the opening, so that the filled area is flush with the hull . . . and go on to stop up the remaining cavities in the same manner.

There . . . you're finished! Stand back and admire your work (and try to resist the temptation to chip off "just a little more" here and there). The adz blades produce an attractive feathered pattern that's usually left intact, at least on the inside. Possible alternatives include sanding the wood smooth and carving decorations into the cedar. Both operations, though, require a thicker—and thus heavier—hull. Norman and Earl chose to adorn their sculpture only with a narrow trim line carved just below the sheer . . . and I think you'll agree, from looking at the photos of the end product, that any further embellishment was truly unnecessary!

A VALUABLE LEARNING EXPERIENCE

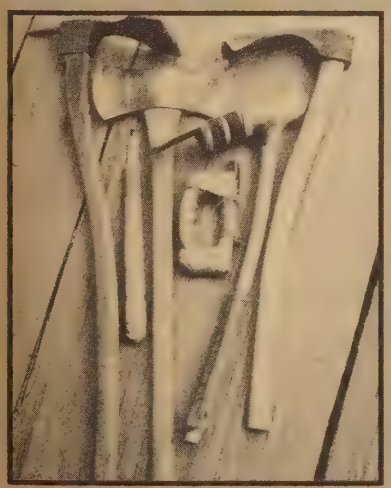
Obviously, carving a traditional Indian dugout canoe from a massive chunk of unyielding wood is no small job: It requires time, patience, persistence, strength, and skill. But as in so many other seemingly formidable tasks, the key to success is more in the *doing* than in knowing how. You learn as you go.

And remember that everybody—even an expert woodcrafter like Tait or Carter—is likely to make mistakes and encounter unforeseen problems. The stem ends on Norman's and Earl's canoe, for example, developed serious checks . . . cracks that had to be pegged together in an effort (time will tell how successful) to keep the extensions from breaking off completely. But even if the worst should happen, Tait will probably just resculpt what remains of the bow and stern, or perhaps carve and attach new stem ends. "Don't be afraid to make mistakes," says Norman. "Most of them can be corrected . . . and all of them will teach you something."

Perhaps a story will best illustrate this point. Charles Jones, a Nootka chief who was an expert canoemaker (and who claimed that you had to have worked on at least *three* canoes to master the art), liked to tell about how *he* learned to create dugouts. One day when Charles was nine years old, his father took him into the woods, bucked a cedar log, and told the boy to try to carve a canoe the way he had seen his elders do it. The old man then sat down to watch, saying, "The uglier it is, the better for you."

Charles's dad knew that the youngster would learn best by making his own mistakes. Come to think of it, that's a good lesson to remember when you're about to tackle *any* challenge!

BASIC CANOE-CARVING TOOLS



Except for some occasional help from a chain saw, Norman and Earl sculpted their entire canoe with the following six hand tools (from left to right in the photo):

Broad adz. *Used mainly for rough-shaping, this tool bites deep—especially at the corners—so swing it with restraint.*

Curved knife. *The boat builders made this finishing implement, which is ideal for delicate work, from a four-inch curved blade purchased from a sculpture supply house and a 12-inch piece of yellow cedar.*

Double-bladed ax. *A heavy, long-bladed feller's ax like this one is necessary to provide ample reach and cutting force for chopping out the hull's interior. The blade's corners should be rounded off with a file so they won't catch in the wood.*

D-adz. *Named for the shape of its handle, this is the perfect canoe-carving tool . . . Tait used it for most of the final shaping. Norman made the D-adz you see here, using a six-inch length of a half-rounded steel file—ground on one end of the curved side to a 15° cutting edge—for the blade and a piece of alder for the grip.*

Elbow adz. *Norman made the blade of this elbow adz—a tool that proved ideal for rough-shaping the sides and stems—by cutting an old automobile leaf spring to a 6-1/2-inch length and grinding one end to form a single-sided cutting edge with a 15° bevel. For the 22-inch handle, he chopped off an alder branch, including an 8-inch portion of the tree's trunk (the limb extended out at about a 45° angle). Then he whittled a flat ledge into about half of the trunk stub, leaving a back notch to keep the blade from sliding. After laying a leather pad between the wood and metal to provide a tighter bond, he wrapped the two parts together with halibut line.*

Cooper's adz. *The scoop-shaped blade of this implement—which is traditionally used for making barrel staves—is useful for cutting across the grain and roughing out the curved bilge line inside the hull.*

Although red cedar is a relatively soft wood, it can dull a cutting edge on any of these tools very quickly. Tait and Carter found that their work was much easier when they took just a few minutes from time to time to restore their blades to razor-sharpness with a whetstone.

(continued from page 174)

CALIFORNIA GIANT SEQUOIAS, biggest tree on earth, hardy to −34°F, guaranteed, 6″ to 12″, three for $10.90, six for $16.90. 13131B Allison Ranch Rd., Grass Valley, Calif. 95945.

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HEALTH & HEALTH CARE PRODUCTS

NOTE: There is a great deal of controversy surrounding "non-approved" medicines and treatments. While THE MOTHER EARTH NEWS® *will* allow sellers of such items and services to advertise in this classified section, be aware that we *do not* necessarily endorse—or trust in the effectiveness of—the medications and procedures being offered.

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"How to Find Medical Information" by medical librarian. $2.00. Free brochure on research services. InfoConnect, P.O. Box 18827, Cleveland Heights, Ohio 44118. 216/371-3484.

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EARTHSHELTER information and pictures of our earthshelter $2. Blueprints and construction manual $14. Planet Earth Homes, Box 386, Lynden, Wash. 98264.

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Entries which end with a name followed by an asterisk (*) indicate that replies must be forwarded through MOTHER. To do this, [1] put each reply in a separate envelope that has your return address plainly marked in the upper left-hand corner, [2] seal and stamp each envelope but don't address the face (if U.S. stamps are not available, remit additional funds to cover postage), [3] lightly pencil the code name from the ad, and the issue the ad appeared in, on the envelope (example: Vermonter*—No. 70), [4] put all such envelopes into one large envelope along with $1.00 in U.S. funds or U.S. stamps for EACH response (or a $2.00 check or money order per response if remitting in Canadian funds), and finally [5] seal the big envelope and mail it to MOTHER.

ATTRACTIVE, feeling, creative, successful, professional, Jewish man, 37, 5′10″, spiritual path; seeking bright, attractive, feeling, slender woman, 25–36, share cat, chickens, rural home; love and financial growth. Photo! Boxholder, P.O. Box 308, Eureka, Calif. 95502.

ATTRACTIVE, energetic, young 36, country-loving lady seeks affectionate, sincere, honest, intelligent gentleman. Photo. P.O. Box 213, Monett, Mo. 65708.

Adventurous educator, 45, male, needs spouse or mate for household in small, mid-western setting. Should be curious, sensitive, affectionate, adaptable, open-minded, independent. I'm interested in experimental life-styles, alternative energy, self-sufficient living, travel, gardening, music, theater, crafts, numerous others. Consider pooling resources for purchase of country home. Photo, please. SASE. Eldorado*.

Employed male engineer, 56, 5′11″, 165, sincere, honest, reserved, trustworthy, seeks relocatable female for lifetime companionship. Quiet, rural country atmosphere in northern Illinois. Recent photo, phone. First letter, photos returned. Boxholder, P.O. Box 966, Woodstock, Ill. 60098.

Wildlife officer, sincere, gentle, 6′, 175, educated, non-smoker, seeking slim, 25–45, vegetarian, Christian lady who likes horses, wilderness, gardening, bees, rural living. Northwesterner*.

(continued on page 182)

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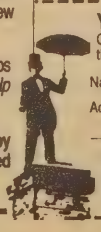

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(continued from page 180)

"OUTDOOR PEOPLE" lists 50-word descriptions of active, sincere singles. Confidential. $1.00/copy, $3.00/listing. Box M122, Ridgefield, N.J. 07657.

CALVINISTIC BAPTIST, Welshman, conservative, evangelistic, 56, divorced, love peace and quiet in country, wilderness, travel. Evangelistic non-charismatic, post-millenium, blue eyes, average. Desire nice, pleasingly plump Christian woman, wears skirts, well versed in Bible theology. Bob, P.O. Box 218, Duluth, Minn. 55801.

Searching for a slender, gentle, nonsmoking/drugs man (33–40). I'm tall, slender, caring, outdoors lady (32) wanting lasting relationship. Shasta*.

NICE SINGLES, ages 18–80, country-oriented, wish to meet others of good character, old-fashioned standards. Free newsletter. Write: Introducing Yourself, Dept. MEN, P.O. Box 454, Crossville, Tenn. 38555.

Woman, 60's, petite, blonde, pretty teeth, smile. Semi-retired professional, Unitarian, environmentalist, enjoys dancing, animals. Seeks bright, compatible man, nonsmoker, no drugs, social drinker OK. S., P.O. Box 75253, Los Angeles, Calif. 90075-0253.

COUNTRY, Pennsylvania man, 51, seeks old-fashioned, country-minded, MOTHER-type companion to love and be loved, non-high classed lifemate, liking independent farm life, children (three), outdoor activities. No smoking, drugs, heavy drinking. Photo. Smiley*.

Fun guy, 33, 5'9", 150, non-drinking, loves children, steady job, college, country life, seeking woman to share with. Ron, Rt. 1, Box 384, Wellston, Okla. 74881.

GENTLE MALE seeks sprightly, independent lady, 25–35, to share life establishing Parkland homestead. Wild, Winnipegosis, Man., Canada R0L 2G0.

Country-loving lady, 33, seeking relocatable, honest, resourceful gentleman, 32–45, who enjoys utilizing his hands, head, and heart. For permanent relationship/family/build and share self-sufficient lifestyle on 30 acres. Boxholder, Rt. 4, Box 57A, Chatham, Va. 24531.

Gentle, honest, active, health-minded, outdoors-loving man, 55, wants lifemate of same interests for high-quality, togetherness life. P.O. Box 1727, Anderson, Ind. 46014.

Man, 30's, 5'10", **PHOTOGRAPHER,** seeks lifemate, attractive, slender, warm woman, similar interests, share travel, country life, nature, gardening. Exchange dreams and photos. Boxholder, Box 254, Hicksville, N.Y. 11801.

Quiet woman (31, 6'), noisy children (6, 5, 3), seeks sincere, thoughtful, communicative, good-humored friends/lifemate of exceptional integrity/depth. I'm very truthful, broad-minded, nature-loving. Enjoy home, wild surroundings, fitness. No calls. Julie Van't Hul, McKay Creek Box 2, Pilot Rock, Ore. 97868.

Modern farmer, 32, 6'1", 175, college grad, seeks educated, attractive, slender lady to share farm life, build family. Glen Murphy, Rt. 2, Girard, Ill. 62640.

Male, 27, Virginian, seeking slim, sincere, natural lady. Relocate, help restore 60-acre mountain homestead. Photo. Randy, Rt. 2, Box 216, Lexington, Va. 24450.

CITY BOY, 29, wants to be country boy. I'm seeking a self-sufficient lifestyle, freedom, and a nonsmoking, compatible mate. I like music, gardening, and adventure. Please send photo and birth date. I'll check our astrological compatibility. David Hernandez, 22359 Montgomery St., Hayward, Calif. 94541.

TIRED of the insanity around you? Need to find the lady to help build a little bit of sanity. Got shelter from the storm. C.B., Box 563, Show Low, Ariz. 85901.

Successful, professional, father of two beautiful boys, (three and five), seeks clean, single, attractive, non-smoking woman to complete our family and add to it. Love children and am 100% family-oriented. Must love the country and be adaptable to rural life. Bob, P.O. Box 20, Harrington, Maine 04643.

LOVE LIVING LIFE! TRADE LONELINESS FOR HAPPINESS. Free information. **AUDIO SUCCESS,** P.O. Box 1138-M, DeFuniak, Fla. 32433.

Attractive lady, 36, seeking nonsmoking man for country life. Melinda, Rt. 1, Box 103, Niangua, Mo. 65713.

Blond, loving homestead employed gentleman, 30, 160, 6', seeks slender, resourceful, homesteading woman. Daniel, Box 13, Tumtum, Wash. 99034.

Holistic, athletic female seeks unique individuals to communicate with. SASE. Deruy, Box 2198, Olathe, Kan. 66061.

Accountant/specialty farmer, 35, tall, slim, financially comfortable, seeks attractive, easy-going lady, 20–40, for lifemate. Boxholder, P.O. Box 55, Edinburg, Va. 22824.

Sensuous country woman, 34, seeks affectionate Christian husband with employment, who has children or desires children. Boxholder, Box 10644, Springfield, Mo. 65808.

INVESTOR, bachelor, young 40's, fit, seeks tall, statuesque woman, 30's. Commitment, travel, homestead **SOMEWHERE,** family. Individualist*.

Levis-over-lace **KITTY** (MOTHER NO. 78) still **"SEEKER MANNING". SASE:** P.O. Box 3, Chilton, Wis. 53014.

MALE, 30, 6'1", 190, self-employed, handsome, out-doors type, strong, reliable, loving. **SEEKS LADY** 18–30 for loving wife. Non-smoker, slender, must be very attractive, affectionate. Let's move to the mountains together this spring. Photo a must. R-J Transportation, Dave. Box 52, Brewster, Ohio 44613.

HARDWORKING GUY seeks slim, country-minded female 18–30. Photo please, returned. Eddie, P.O. Box 21, Meta, Mo. 65058.

SWM, resourceful outdoorsman, 31, nonsmoking, non-drinking, vegetarian, seeking adventurous woman to homestead self-sufficient life. Thoreau*.

Male, teacher, 36, widowed, three children, enjoy all out-door activities, music, dancing, reading, talking. Want to laugh and enjoy life with a good woman. New Life*.

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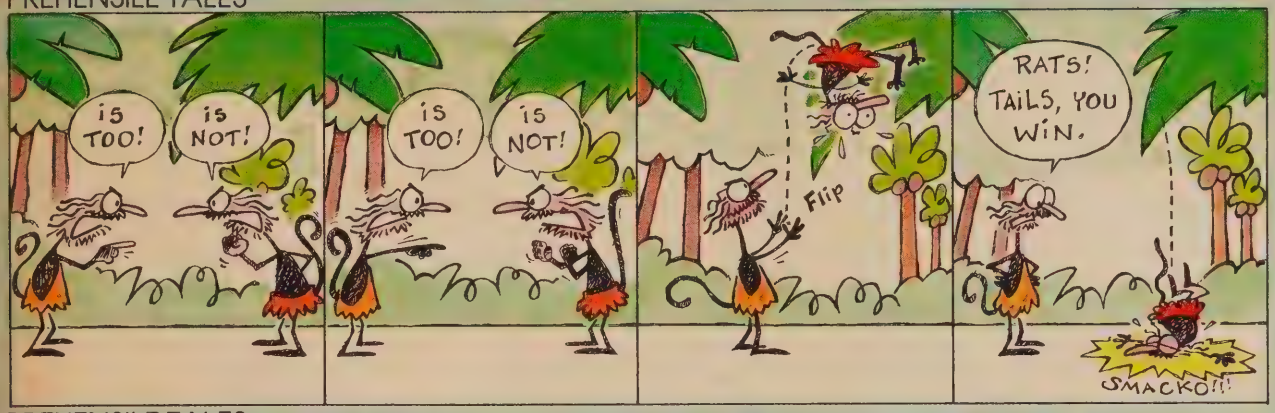

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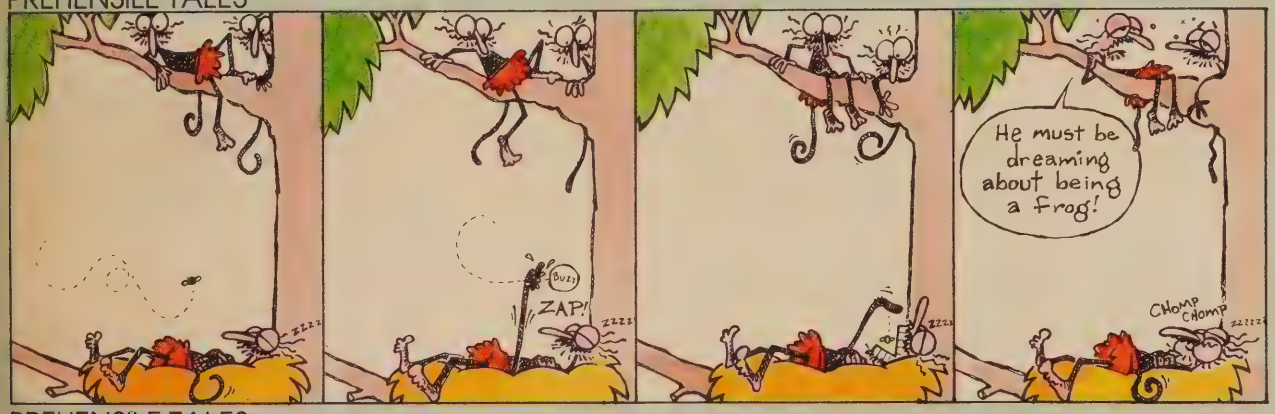

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It's so much fun swinging from vine to...
...vine.
But I wish we'd hurry and invent paramedics!

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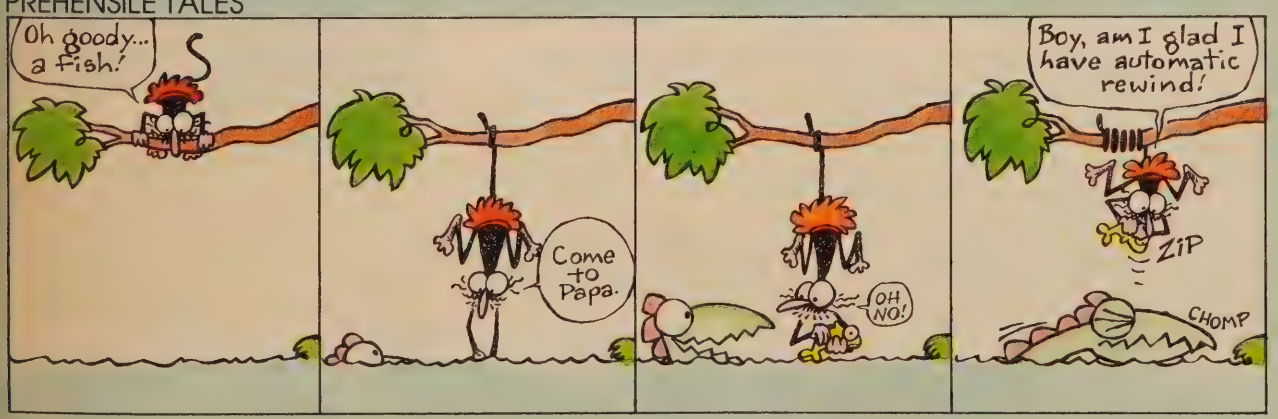

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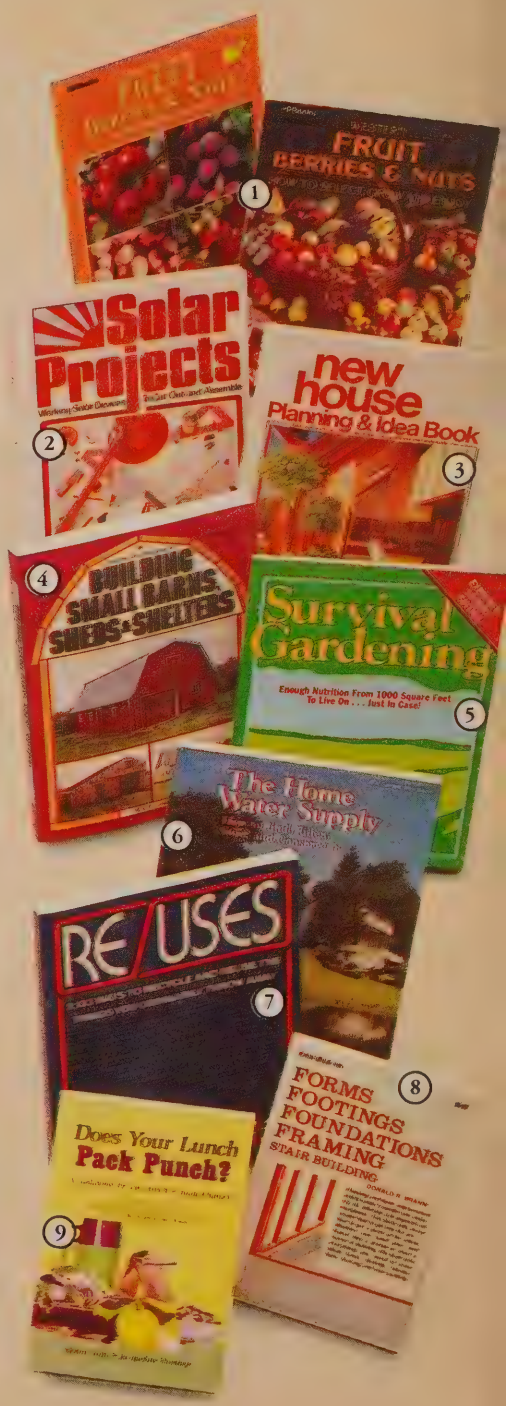

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(continued from page 182)

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NORTH IDAHO: 30 acres, exquisite view, level, timber, springs, remote, cabin, $39,500. Terms. Other listings. Betsy V. Realty, Box 602, Priest River, Idaho 83856. 208/448-1652.

Tennessee—Sixteen acres, 11 wooded. House, new wiring, plumbing. Barn, garage, root cellar, outbuildings. $25,000. Stevenson, Rt. 6, Tazewell, Tenn. 37879.

ALASKAN federal wilderness land—$2.50/acre. (Lakefront and riverfront available.) **LEASE** Canadian land—$1.00/acre. **BUY** repossessed homes from U.S. government—$1.00 plus repairs! Details, Alaskan maps, federal regulations—$4.95/report. All three reports—$9.95. **HOMESTEAD,** P.O. 5741-T7, Yuma, Ariz. 85364.

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MISSOURI OZARKS: Cabin, three acres, well, electric, $7,500. 20 acres, spring brook, south slope, $6,600. 417/948-2657.

OZARKS, 82 SCENIC ACRES, home, outbuildings, utilities, privacy, hunting, $85,000. June Overstreet, Leslie, Ark. 72645. 501/447-2475.

Kentucky—206 acres, pasture, springs, hardwoods, owner financing. Michael Zoeller, Rt. 1, New Haven, Ky. 40051.

(continued on page 189)

DEAR MOTHER,

(continued from page 172)

I was interested to read about the wholistic detoxification method in the Bits and Pieces column of MOTHER NO. 83. I'm happy to see at least one scientist on the right track in cleansing the human body of its impurities *without* promoting the use of drugs.

The program Dr. Max Ben is working with sounds very similar to the one developed by a man named L. Ron Hubbard. I tried his method a while ago and experienced increased alertness, energy, and vitality that have barely subsided since then.

William L. Ferguson
Chula Vista, Calif.

Mr. Hubbard did, in fact, develop the detoxification program that Dr. Ben has been employing.—MOTHER.

Does anyone know of a good organic gardening book for people living in the tropical climate of Central America? The guide *must* be in English!

Karen Miller
Costa Rica

You did a great job on Julie's and my article on dog packing (MOTHER NO. 82, page 82) . . . overall, I'm very pleased with it. However, I do have one gripe. The Wenaha dog pack I described was given to me by Tun-dra Outfitters (16438 96th Avenue, Nunica, Michigan 49448) and not—as you printed—by Recreational Equipment, Inc. I would appreciate it if you could give Tun-dra a mention. I've been doing business with the folks there for quite a few years, and I've never had reason to complain: They're fast, efficient, and personal. The store also sells sleds, wheeled rigs, harnesses, and other dog-mushing paraphernalia.

Miki Collins
Lake Minchumina, Alaska

I've used my kerosene heater for three years, but last fall it kept burning out. Since it seemed to go out every time I relit it, I bought myself a new wick. Then, while giving the heater its annual cleaning with mineral spirits, I rinsed the old wick, and discovered that the residue that had collected in it was causing the trouble. If I had cleaned the wick along with the heater every year, I could have saved myself some bother, as well as the price of a new wick.

George L. Bley, Jr.
Chattanooga, Tenn.

In California, black widow spiders like to hide in garages and sheds. In fact, I have been bitten by one (a very unpleasant experience). I've found that the smoke from burning green eucalyptus leaves is a strong repellent to most arachnids and insects. The fumes clean the bugs out while leaving an agreeable scent.

Jim Asselin
Sacramento, Calif.

COMING UP IN MOTHER NO. 86!

It seems a tad hard to believe (since we're writing this at the very *beginning* of winter, and you're reading it smack in the *middle* of the cold season), but our next issue will herald the spring of 1984. And, in keeping with that season, we'll have a whole slew of articles aimed at getting you out of the house and into the (finally!) warming weather.

THE PICK OF THE CROP FOR '84: Yep, Brent Elswick, MOM's indefatigable seed tester, is back . . . with his garden-proven selections from the year's new seed offerings, as well as a few tips about *older* seed varieties that might be worthy of a second look.

POLE SHELTERS: Almost every property owner has—at one time or another—daydreamed about putting up some easy-to-build and inexpensive outbuildings. Well, in our next issue we'll teach you one of the best bootstrap construction techniques there is.

MOUNTAIN BIKES: They go by a number of names—clunkers, all-terrain bikes, off-road bikes, and more—but whatever you call them, the new generation of multispeed, fat-tired bicycles may well prove to be the most practical (and fun) form of two-wheeled transportation ever . . . for city *and* country riders. We'll let you know what's available, and help you match a machine to your needs, in our next issue.

AN OUTDOOR RECREATION MINI-MANUAL: Over the last few years a kind of snobbery seems to have infected the hiking/camping industry . . . to the point that some of the special-interest backpacker magazines have started to have a *Cosmopolitan* sort of sound to them. We'll show you how to short-circuit the fads . . . and enjoy safe, comfortable outings at minimal expense.

AND MORE: MOTHER NO. 86 will be packed with articles on the whole range of subject areas typically covered by this magazine. So whether your pet interest is alternative energy or wholistic health . . . woodworking or baking . . . or ecology or electronics, MOTHER NO. 86 will have plenty of features for *you*. Don't miss it!

MOTHER'S SCRAPBOOK

10 Years Ago...

MOTHER NO. 25: Excerpts from *Foxfire 2* and *Farming for Self-Sufficiency* keynoted this issue and provided information that ranged from turning work into play (with quilting bees, barn raisings, logrollings, and corn shuckings, for example) to making a lot of living on just five acres . . . with creative independence and "cottage economy".

Issue 25 included several timely tips for late winter: an energy-saving way to make maple syrup—using Eskimo technology—by alternately freezing and thawing the sap to thicken it and increase the sugar concentration . . . a special stacking trick that helps you cut a week's supply of firewood in minutes . . . and a design for a simple solar oven for free cooking on clear days (even in winter!).

Our colorful poster insert entitled "Weather Wisdom" brightened the pages of No. 25 and told how to build a rain gauge, read a barometer, stay safe during a tornado, and identify various types of clouds.

We published a collection of wholesome recipes incorporating bulgur (a Middle Eastern variation of parched cracked wheat) *and* outlined krauting, fruit-drying, salting, and other time-honored ways to stock the larder.

An article by James B. DeKorne revealed his innovative plan for combining a root cellar and bathhouse to provide year-round hot water for his homestead.

5 Years Ago...

MOTHER NO. 55: The Plowboy Interview with Lance Crombie, a Minnesota "moonshiner" who invented a sun-powered still, served as a firsthand progress report on the alcohol-fuel movement. Readers received even more alternative-energy news from articles on "the alcohol-gasahol fuel solution", a 150,000-Btu woodburning furnace, *and* a Trombe-wall solar house.

Gardeners learned how to cultivate homegrown popcorn, a bush-breed sweet potato that can thrive anywhere, and high-yield hybrid vegetables with a superior taste, as well as how to make a cold frame that can be set up and taken down *quickly*.

Barnyard advice centered on how *not* to raise goats . . . how to get free chickens . . . and how to safely restrain and medicate your horse.

Do-it-yourselfers found plenty to challenge them, from directions for sewing long johns out of discarded sweaters to reheeling shoes with used auto tires.

Shirley Sipp shared her old-timey beauty secrets, and a fitness feature discussed running for the right reasons and for the best results.

(continued from page 187)

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BREWING/WINEMAKING supplies, equipment, and books. Free catalog, fast service. **GREAT FERMENTATIONS,** 87F Larkspur, San Rafael, Calif. 94901.

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Outside, the garden lies still, a rectangular expanse of dormancy buried beneath a deep mulch of snow. Inside, carefully stored reminders of its abundance still deck the dinner plate . . . prodding the ardent seed-tender to pour another cup of hot tea, unfurl plant-frocked catalogs, and start sketching fantasies of this year's garden.

LOOKING O'ER THE 84's

Peter Hemingson

Leading the long list of new crop releases for 1984 is a eye-catching array from Park Seeds. The selection that I tried this past season was a real winner: Better Bush VFN tomato. This breakthrough cultivar fruits all season long, just like an indeterminate variety, but the plant's habit resembles *determinate* tomatoes: The bushes are a compact 3 to 3-1/2 feet tall. Though my test planting undoubtedly benefited from my new drip-irrigation system, I was astonished by the incredible vigor of Better Bush. The stems resembled young saplings, yet the weight of the fruit tipped the bushes over, stakes and all. I'd recommend this variety . . . but make sure you give the plants lots of support!

Also new from Park are Bush Kentucky Wonder bean, which produces pods in 51 days on plants 12 to 15 inches high . . . "Spud-Buds", tiny potato starts about the size of a marble that are said to be free from viral, bacterial, and fungal diseases (and which—Park claims—give a 20% increase in yield over other spud varieties) . . . and a new cream-colored Alpine strawberry called Pineapple Crush that produces tasty, conical berries in its *first* year from seed!

The South Carolina-based company also offers Pretty Pops popcorn (with the coloring of Indian corn and a fine, nutty flavor when cooked) . . . Green Magic zucchini (a space-saving bush variety) . . . and Easter Egg Hybrid radish (with purple, red, pink, violet, or white roots). *[EDITOR'S NOTE: For Park's address—and those of most other seed companies mentioned here—see "MOM's 1984 Seed Company 'Wishbook' Guide" on page 61.]*

More than 150 varieties of rare and unusual vegetables are listed in the $2.00 catalog of Le Marché Seeds International (Dept. TMEN, P.O. Box 566, Dixon, California 95620). Among the rainbow offerings of this small gourmet seed house are pink celery, yellow jalapeño pepper (perfect for making the famous AHUA! Swedish hot sauce), blue tortilla corn, Blonde de Lyon sorrel, and Solaize blue leek. And to help you cook up a colorful meal, Le Marché includes over 40 recipes in its catalog.

PHOTO COURTESY OF GEO. W. PARK SEED COMPANY, INC.

Fruit lovers will be glad to know that two years after Henry Field Nursery first announced the availability of the Turnbull Giant pear, the supply has finally caught up with the great demand. The Turnbull pears are smooth and creamy in texture, delicious in flavor . . . and up to three pounds each in size! In fact, fruit set is so heavy that thinning is necessary to keep the weight of the pears from breaking the branches. Turns out that that's a good thing . . . since the *green* fruits have a crisp, applelike flavor and texture all their own, with none of the grittiness unripe pears usually display. Field says the thinnings are fine for eating out of hand . . . for using in pies, salads, sauces . . . or for any recipe calling for apples. Turnbull is also resistant to fire blight and tolerant of drought, heat, and cold.

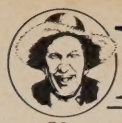
Our good friends at Liberty Seed Company have just reported on the trials they conducted on varieties for 1984. Showing particularly well were the following: Red Ace hybrid beet (maturing a week ahead of Detroit Dark Red and holding its quality right up to *softball* size) . . . Summer Delicious sweet corn (a high-quality late yellow cultivar that matures 9-inch ears in 95 to 100 days) . . . Double Delight corn (the first bicolor super-sweet cultivar) . . . and Miracle corn (a top-notch 78-day yellow super-sweet variety with ears crammed with 22 rows of kernels). Liberty also offers Hybrid G, a very early Chinese cabbage . . . Bush Star muskmelon, said to be the tastiest of the compact growers . . . and Hybrid Bush Pickle cucumber, a very early cultivar that crops heavily.

From Down East in Maine, Johnny's Selected Seeds has a catalog full of vegetables that can stand up to the New England cold. To my mind, the biggest news is the introduction of a selected strain of what I think is the best-tasting winter squash, Delicata. Johnny's has been working on this variety for some time, and I can't wait to try it. Also new are Case Knife pole bean (actually a heritage variety that's been off the market for years), which bears delicious stringless 8-inch flat pods in 65 days . . . Clarion carrot, a long, exceptionally flavored Nantes type that's slow to oversize and freezes well . . . Northern X-tra Sweet corn (at 76 days, the earliest-maturing super-sweet yet and a good germinater in cool soils) . . . and Bellstar tomato, a meaty processing cultivar that's perfect for sauce and paste (the 4- to 6-ounce fruits are twice the size of most Roma tomatoes, yet require less cooking to achieve the proper consistency).

Otis Twilley's new varieties in the "Professional Series" are Pacemaker III hybrid beet (less susceptible than most to cercospora disease) . . . Honeybrew melon (resistant to fusarium and powdery mildew, and with an unusually long-lasting sweetness) . . . Great Time corn (an 80-day yellow super-sweet hybrid that's tolerant to northern blight) . . . Set More 100 cucumber (a mixture of 70% gynoecious and 30% monoecious varieties) that's tolerant to downy and powdery mildew, CMV, scab, ALS, and anthracnose . . . Blue Knight hybrid kale (faster-growing than the open pollinated Vates type) . . . Pro Belle II pepper (a highly productive 72-day variety) . . . and Independence VFF tomato (an early midseason determinate cultivar).

The two vegetable All-America Selection winners for 1984 are Celebrity VFFNT tomato (a 70-day disease-resistant determinate cultivar that's more productive than Floramerica) and Sugar Ann, the earliest snap pea and—unlike her mother, Sugar Snap—a compact bush plant. Both AAS varieties are widely available, from store displays of such firms as Northrup King, and by mail from Park, Burpee, Twilley, and Johnny's.

So why not turn to the vegetable and herb company listings on pages 61 and 95 . . . and order yourself up some gardening dreams!



LAST LAUGH

"Oh, yes, the television knows many stories. But the storyteller knows me."

Ron Evans

Well sir, the past two Januarys I've jist *had* to tell you about all the extraordinary tale-tellin' I'd heard the previous falls at the National Storytelling Festival in Jonesborough, Tennessee. And I'm a-goin' to do the same thing right now, too. This time, though, I've got a new wrinkle to add . . . namely, that you no longer have to jist *read* about this annual storytellers' shindig. Now, you kin *listen* to it, too! You see, the folks at the National Association for the Preservation and Perpetuation of Storytelling—NAPPS, fer short—have jist cut a two-record set featuring *twenty* of the festival's best tales and tellers. Now I cain't describe all the wide variety of stories on this pair of discs. But I *kin* share a couple of the shorter tales with you. Still, remember as you read, that *lookin'* at these stories compared to hearin' professional tellers perform them . . . well, it's like readin' about a twenty-course feast compared to *eatin'* it! Both these stories happen to come from religious traditions. Pleasant DeSpain told the first one, "Old Joe and the Carpenter" (copyright © 1979 by Pleasant DeSpain).

* * *

Old Joe lived way out in the countryside, and he had one good neighbor. They'd been friends all their lives long. It seemed that they had grown old together. And now that their spouses were dead and buried and their children raised and living lives of their own in other places, all they had left were their farms . . . and each other.

But for the first time in their long relationship, they'd had an argument. And it was a silly argument. It was over a stray calf that neither one really needed. It seemed as though the calf was found on Joe's neighbor's land, and so he claimed it as his own. But Old Joe said, "No, no, now that calf has the same markings as my favorite cow, and I recognize it as being mine."

Well, they were both a bit stubborn, so the upshot of it was they just stopped talking to each other. That happened about a week before, and it seemed that a dark cloud had settled over Old Joe . . . until there came a knock on his door.

He wasn't expecting anybody that morning, and as he opened the door, he saw standing before him a young man who had a box of wooden tools on his shoulder. He had a kind voice and rather dark, deep eyes, and he said, "I'm just a carpenter, and I'm looking for a bit of work. Maybe you'd have some small jobs here and there that I can help with."

Old Joe wasn't the kind of fellow to take someone on just right off, so he brought him on into the kitchen and sat him down and gave him some stew that he had on the back of the stove. There was some homemade bread (it was baked fresh early that morning), some fresh churned butter, and homemade jam. While they were sitting and eating and talking, Joe decided that he liked this young fellow, and he said, "I do have a job for you. Look right there through my kitchen window. See that farm over there across the way? That's my neighbor's place. And you see that crick running right down there between our property lines? That crick, it wasn't there last week. My neighbor did that to spite me, dadburn it. He took his plow up there with a tractor, and he just dug a big old furrow from the upper pond, and then he flooded it.

"Well, I want you to do one better. Since he wants us divided that way, you go out there and build me a fence—a big, tall fence—so I won't even have to *see* his place no more. Goldurn him anyhow!"

And the carpenter said, "Well, if you have the lumber and the nails, I got my tools, and I'll be able to do a job that you'll like."

Joe had to go on to town to get some supplies, so he hitched up the wagon and showed the carpenter where everything was in the barn . . . and that carpenter, well, he carried everything he needed down to the crick side and he started to work.

And, oh, his work, it went smooth and fast. He did his measuring and his sawing and his nailing . . . and it was about sunset when Old Joe returned and the carpenter had finished his work. And when Old Joe pulled up in that wagon, his eyes opened wide and his mouth fell open . . . because there wasn't a fence there at all.

It was a bridge, going from one side of the crick to the other! It had handrails and all—a fine piece of work—and his neighbor was just starting to cross the other side of that bridge with his hand stuck out, and he was saying, "Joe, you're quite a fellow to build this bridge. I'da never been able to do that. I'm so glad we're going to be friends again!"

And Joe, he put his arms around his neighbor and he said, "Oh, that calf is *yours*. I've known it all the time. I just want to be your friend, too."

About that time, the carpenter started putting his tools in the box and then hoisted it up onto his shoulder, and he started to walk away. And Joe said, "No, now wait, come on back, young fellow. I want you to stay on. I got lots of projects for you."

The carpenter just smiled and said, "I'd like to stay on, Joe, but you see, I can't. I got *more* bridges to build."

So he walked on, and there ends my tale.

* * *

Diane Wolkstein says she first heard this next story in synagogue, appropriately enough on Yom Kippur, the Day of Atonement. It's called "The Seer of Lublin's Shirt" (copyright © 1982 by Diane Wolkstein).

It was Rosh Hashanah, and Moishele, who was just a poor man, but a *good* man, came into the synagogue. And the Seer of Lublin looked over at him and said, "Moishele, you're so bedraggled. You're a wreck!"

And he looked and, indeed, it was true. He had a shirt, and one side was red and the other side was blue, and then there was a little green and some patches . . . and it was just put together from all the shirts he'd ever worn and stitched. That's all he had on. And on top of that, it was all holes.

So the Seer of Lublin said, "Let me give you my shirt." And he took it off and gave it to him.

Moishele started walking down the road, feeling *wonderful*, wearing the Holy Seer of Lublin's shirt. As he walked down the road, he met the drunkard in the town. And the drunkard said, "What's happened? Why do you look so wonderful?"

He said, "The Seer of Lublin gave me his shirt."

"Ohh, it's sooo beautiful," said the drunkard.

And Moishele, who had the kindest heart in the world, said, "Do you want it?" and just *gave* it to him.

As soon as the drunkard got the shirt, he took it into the tavern, and he said, "Look what I have! The Holy Seer of Lublin's shirt! What am I bid for it?"

And the people were amazed. But you know, there's powers in the shirt of a holy man. And the bartender, who knew the drunkard well, said, "A year's supply of drinks!"

"Sold!" he said.

Then the bartender, who knew the value of the shirt, took it to the market the next day and said, "Any woman who cannot conceive has only to put on this shirt and she will bear children." Can you imagine the price he got?

Soon the word came back to the Seer of Lublin of what had happened to his shirt. And when he saw Moishele the next day, he could hardly look at him. And Moishele felt so terrible that the Seer of Lublin should think that he had sold his shirt for a profit, that he just left the town and he went to sit in the cemetery.

As he was sitting there, a man came and said, "What's happened? Has someone died?"

And Moishele said, "Maybe it's my honor."

The man said, "Tell me," and he told him. And the man said, "Let me tell you a story. Sometimes from helping others, good comes, but you just don't know.

"In my town, there was a thief, and he was a *real* thief. Everyone in the town had something missing, and it was always he who took it. He was such a good thief, he really got rich. And he got so rich, he decided to give up being a thief and bought a house and sent his children to school. Then he sent his children to the synagogue. *Then*, once he became a really good Jew, he couldn't steal anymore. *Then* he lost all his money! It was a dreadful position. And he started to beg. And the people said, 'What! You who stole our things want begging money from us? Forget it!'

"Nobody would give him any money. He got poorer and poorer and poorer, but he refused to steal. The richest man in the town was walking by and saw this man who was once a thief sitting on his steps, looking miserable. Not only did he look miserable, he looked hungry. And that night the richest man in the town sent him money to eat. And every sabbath since then he sent him money to eat . . . all his life.

"And after many, many years, it happened that the richest man in the town and the thief both died on the same day. The funeral parlor was filled with the friends of the richest man in the town. As for the thief, there were just a few of his old students who were there.

"But when the richest man in the town got up to heaven, and they had the scales of justice, it turned out he had so many sins there wasn't a chance in the world he could ever get into paradise.

"Just that moment, there was a breeze. Suddenly, he was pushed in! There he was in paradise! He asked, 'How did it happen?' They said, 'Your friend, the thief, stole your sins.' "

EDITOR'S NOTE: The double album Storytelling: The National Festival *is available for $16 postpaid from NAPPS, Dept. TMEN, P.O. Box 112, Jonesborough, Tennessee 37659.*

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